AVIATION WEEK

JULY 6, 1953

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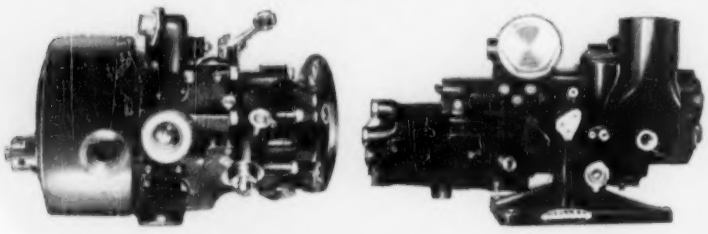

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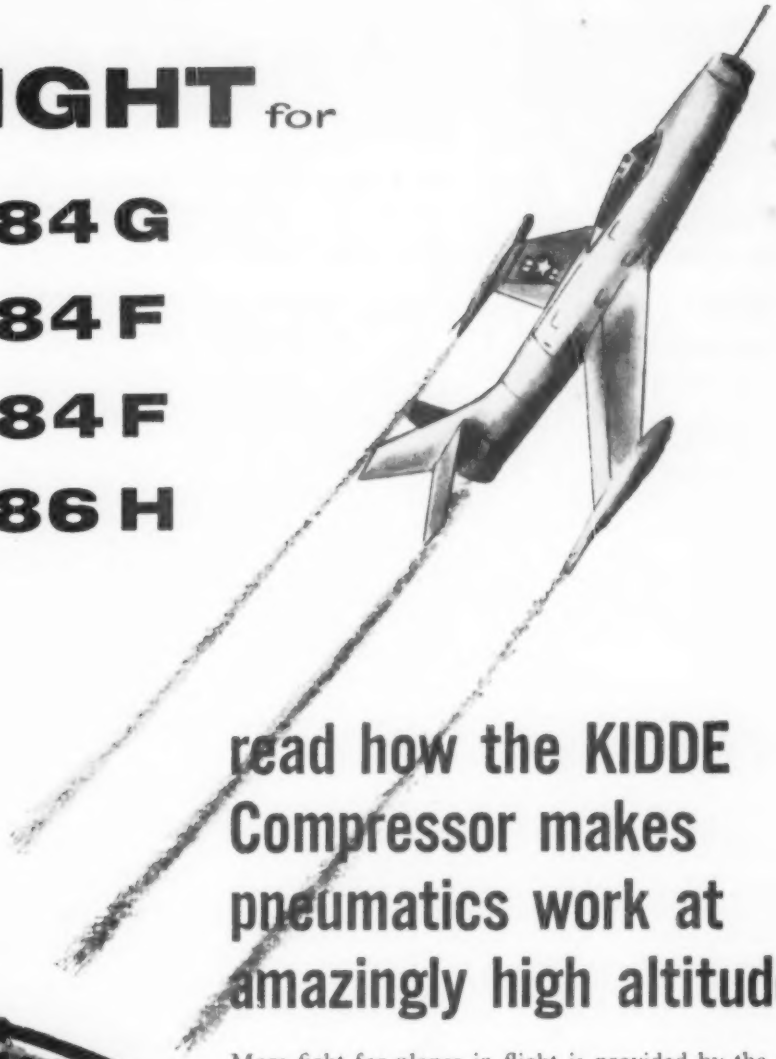
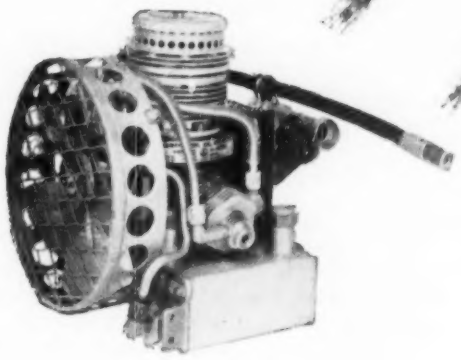


read how the KIDDE Compressor makes pneumatics work at amazingly high altitudes



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Think of it! The very space you fly through becomes your reservoir of pneumatic power. The supply is literally unlimited.

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for aircraft

NEW! Teflon connectors with Inconel Volute Springs

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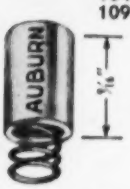

1041-C Steatite
1041-M Mycalex
1041-D Alumina
(AN 4164-2)

1099-C Steatite
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9/16" and 1" sleeves only, without springs, are also available

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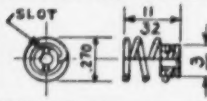

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for military trucks and tanks (for 5 mm cable)

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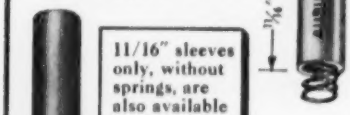

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Used with all 11/16" connectors on 5 mm cable

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Used with all 9/16" and 11/16" connectors for 5 mm cable

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Aviation Week

Volume 59 — July 6, 1953 — Number 1

Editorial Offices: 330 W. 42nd St., New York 36. Tel. Longacre 4-3000
National Press Bldg., Washington 4, D. C. Tel. National 8-3414

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AVIATION WEEK • July 6, 1953 • Vol. 59—No. 1
Member ABP and ABC

Published weekly by McGraw-Hill Publishing Company, James H. McGraw (1860-1948), Founder. **Publication Office: 99-129 North Broadway, Albany 1, N. Y.**

Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Curtis W. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Division; Ralph B. Smith, Vice-President and Editorial Director; Nelson Bond, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Director of Circulation.

Subscriptions; Address correspondence to AVIATION WEEK—Subscription Service, 99-129 North Broadway, Albany 1, N. Y., or 330 W. 42nd St., New York 36, N. Y. Allow ten days for change of address.

Subscriptions are solicited only from persons having a commercial or professional interest in aviation. Position and company connection must be indicated on subscription orders.

Single copies 50¢. Subscription rates—United States and possessions, $6 a year; $9 for two years; $12 for three years. Canada, $8 a year; $12 for two years; $16 for three years, payable in Canadian currency at par; other Western Hemisphere, $10 a year; $16 for two years; $20 for three years. All other countries $20 a year; $30 for two years; $40 for three years. Entered as second-class matter, July 16, 1947, at the Post Office at Albany, N. Y., under Act of Mar. 3, 1879. Printed in U. S. A.

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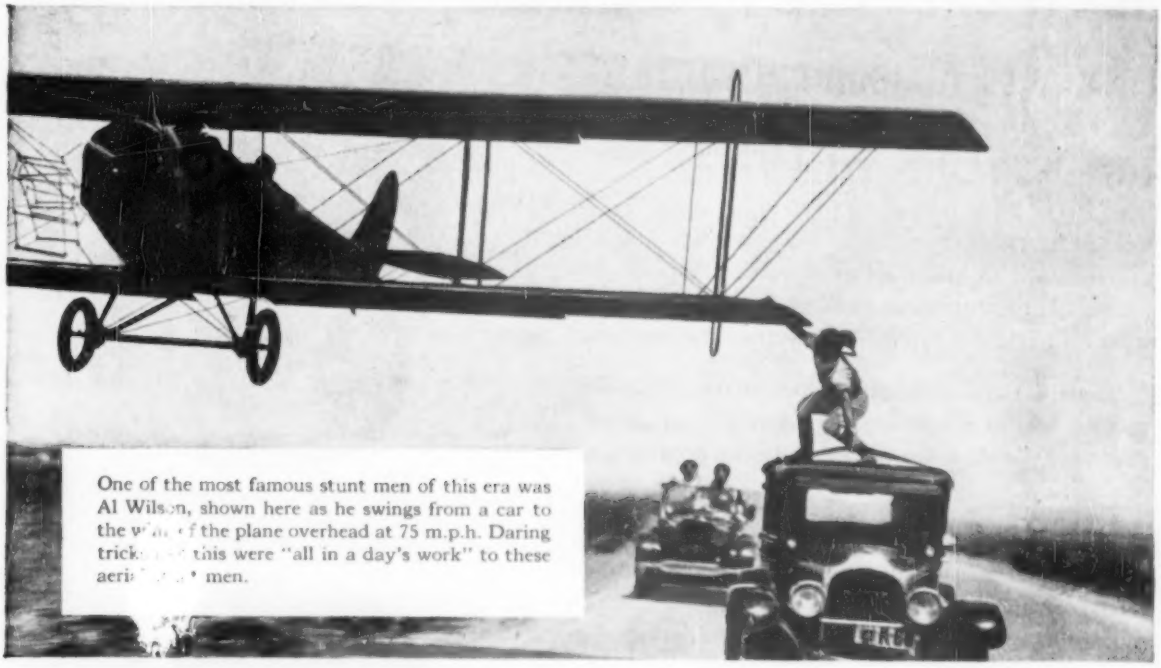
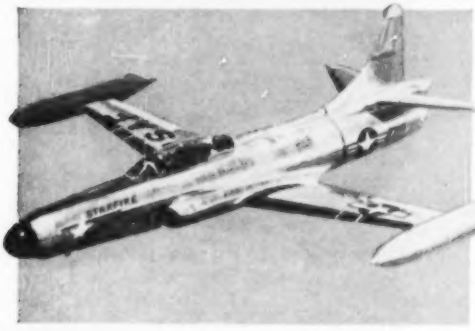
Aerial Doredevils of the Twenties

Many of the aviators returning home from World War I "bitten" by the flying bug, sought to capture the public's imagination and greater support for aviation by barnstorming exhibitions at fairs, and other community gatherings, throughout the country. They toured and stunted with planes salvaged from the war, gave flying lessons and took passengers on short flights.



One of the most famous stunt men of this era was Al Wilson, shown here as he swings from a car to the wing of the plane overhead at 75 m.p.h. Daring tricks like this were "all in a day's work" to these aerial stunt men.



TODAY aviation is so much a part of our environment it needs no such spectacular daredevil tactics to prove itself. Symbolic of the great strides made in the field of aeronautics is the U. S. Navy's F-94C Starfire built by Lockheed. Capable of speeds over 600 m.p.h. the Starfire houses 24 rockets in a ring around its nose and features radar-spotting and automatic firing mechanisms.

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During the years of aviation's most rapid growth Phillips Petroleum Company has helped meet the increasing, ever-changing demands for improved aviation fuels and lubricants.

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Phillips 66

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1903 50TH ANNIVERSARY OF THE AIRPLANE 1953

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Corrosion-resistant and able to withstand high loads . . . resistant to oxidation at elevated temperatures . . . resistant to corrosion cracking . . . strong and long wearing...and ten percent lighter than tin bronzes...

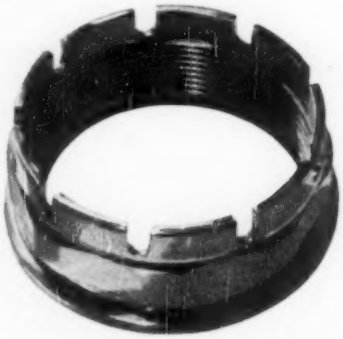
These are characteristics which make nickel-aluminum bronze a *preferred material for jet aircraft parts, such as those illustrated, and allied applications.*

Nickel additions (up to five percent) refine the grain and stabilize the high mechanical properties of aluminum bronze and improve its resistance to attack from corrosives, wear and heat. Up to 750° F., nickel-aluminum bronze retains much of its strength, and in temperatures of 600 to 1200° F. a thin, tenacious self-healing oxide or sulphide film retards surface deterioration.

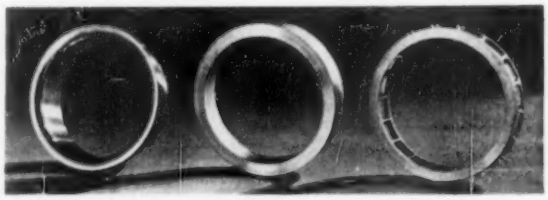
High hardness makes nickel-aluminum bronze excellent for wear-resisting applications, particularly where lubrication is poor, and the superior erosion and cavitation resistance of this alloy becomes emphasized when compared with that of other high copper alloys.

And they exemplify how an alloy containing nickel may help you reduce bulk and deadweight, combat wear or corrosion, or meet other specific requirements. When you encounter metal problems, send us details for our suggestions. A copy of our 12 page bulletin on Nickel-Aluminum Bronze is yours for the asking. Write for your copy today.

Fuel Pump Plunger Rotor of 5% Nickel-Aluminum Bronze. This is a heat-treated forging produced by MUELLER BRASS CO., Port Huron, Michigan, for use in jet aircraft engines.



Propeller Nut Forged From 5% Nickel-Aluminum Bronze produced by MUELLER BRASS CO. for use in conventional aircraft.



Nickel-Alloyed Aluminum Bronze . . . centrifugally cast (left) propeller rear cone . . . (center and right) rough-turned and finished jet engine bearing retainer ring . . . produced by WHEELING BRONZE CASTING COMPANY, Moundsville, W. Va.

INCO

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

NEWS DIGEST

New French Jet Has Skid Landing Gear

Here is first photo of Sncase S.E. 5000 Baroudeur single-place light ground attack plane which is designed to take off from a jettisonable wheeled trolley and land on retractable skids. Powerplant is an Atar 101 axial-flow turbojet of approximately 6,000 lb. thrust fitted with an afterburner. The craft's thin wings are swept 35 deg. The Baroudeur's top speed is expected to be near sonic.

Domestic

Gen. Nathan F. Twining was sworn in last week at the Pentagon as USAF Chief of Staff, succeeding Gen. Hoyt S. Vandenberg, who retired earlier the same day after the Air Force awarded its outgoing chief the Distinguished Service Medal and staged a farewell review of jet planes and marching troops at Bolling Field.

Cornell-Guggenheim Aviation Safety Center has joined the Flight Safety Foundation in new offices at 471 Park Ave., New York.

W. M. Cady, 46, guided missile research expert for North American Aviation, died June 30 at Pasadena, Calif.

J47 jet engines powering AF's F-86D all-weather fighter will be equipped with General Electric's new afterburner fuel pumps, replacing "heavier and more complex" systems that involve combinations of boost and afterburner pumps with associated wiring, GE announces.

Charles F. Horne, former Civil Aeronautics Administrator, has been named manager of Consolidated Vultee Aircraft Corp.'s Guided Missile Div. at Pomona, Calif., Convair president Joseph T. McNarney announced last week.

Bell 47D helicopter has completed 4,000 hr. of accident-free flight during three and a half years of airmail transport over more than 250,000 mi., its operator, Helicopter Air Service, reports.

Collins Radio Co.'s VHF navigation and communications unit will be installed in 57 Convair 340s now in production. Each installation will include three 51R navigation receivers, two 18S-4 communications transmitter-receivers, antennas, automatic tuners, glide slope receivers, power supplies, and associated equipment, Collins says.

Lt. Gen. Thomas D. White has been confirmed by the Senate as Air Force Vice Chief of Staff with the rank of general.

National Business Aircraft Assn. is the new name of Corporation Aircraft Owners Assn., an organization representing companies that own one or more planes for transporting executives and priority.

Bendix Aviation Corp. has signed two five-year contracts with Kayaba Industrial Co., providing for production of aircraft landing gear and hydraulic controls by the Japanese firm in return for 5% of the selling profit.

Brig. Gen. Kurt M. Landon took over last week as chief of staff of the Air Research and Development Command, Baltimore, succeeding Col. John W. Carpenter III, who will attend the Air War College at Maxwell AFB, Ala.

Civil aircraft owned by U. S. businessmen total 11,000 planes ranging from small single-engine craft to large transports. Last year they flew more than 422 million plane-miles, Aircraft Industries Assn. reports.

Sterling W. Camden, Jr., 39, executive vice president of Air Line Pilots Assn., died of a heart attack June 15 at his desk in ALPA headquarters in Chicago.

Financial

Temco Aircraft Corp. stockholders have approved an increase of the Dallas company's stock from 1.3 million shares of $1 par value to 3 million at $1 each.

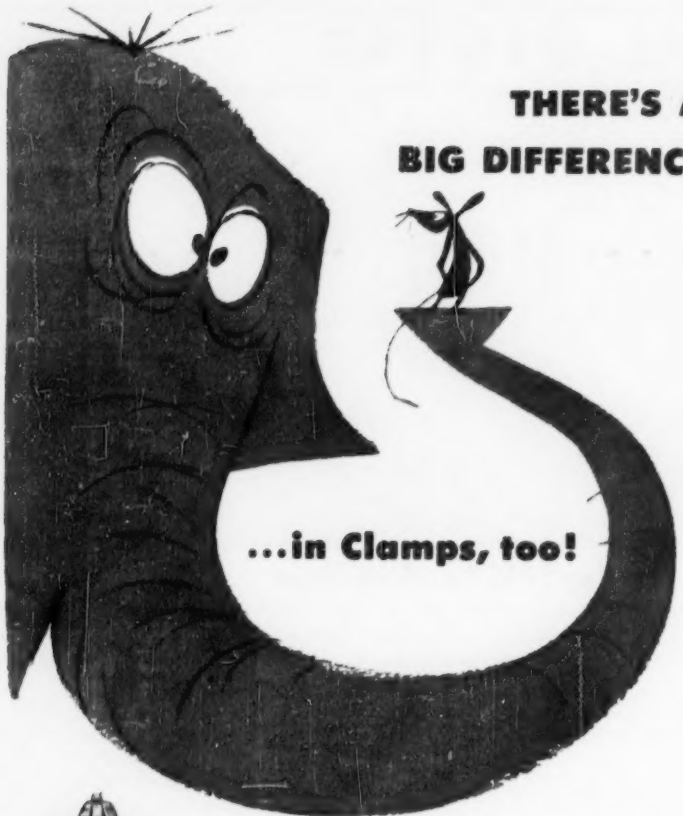
Northwest Orient Airlines reports a net income of $494,774 for May from operating revenues totaling $5,634,948.

Solar Aircraft Co., San Diego, has declared a regular quarterly dividend of 25 cents on each share of common stock.

International

Advanced military trainer has been designed by Hindustan Aircraft Factory, Bangalore, India. Mockup of the new H.T. 10—to be powered by a 1,200-hp. engine—has been completed and plans call for test flight late in 1955.

Silver City Airways, London, has taken delivery of a double-deck, 50-ton Breguet 761 Deux-Ponts airfreighter, will test it for possible cross-channel ferry of cars and cycles.



Precision is the big difference that makes Monogram 3-H Clamps so superior in the fabrication of sheet metal riveted and welded sections of aircraft. They are precision-made to do a precision job and offer many big advantages:

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- **One piece construction.**
- **Safe, will not fly apart.**
- **Sturdier, last longer.**
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Write today for catalog on the many types and sizes of Monogram 3-H Clamps and applying tools.

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SAFETY CLAMPS

The Aviation Week

July 6, 1953

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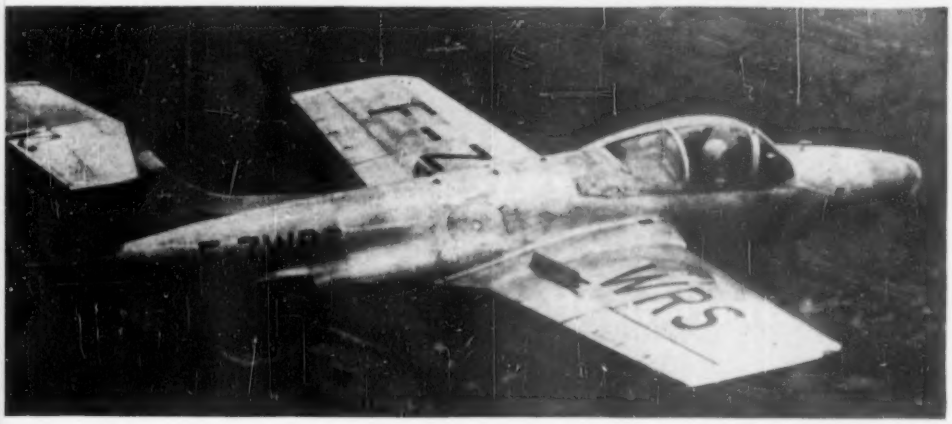
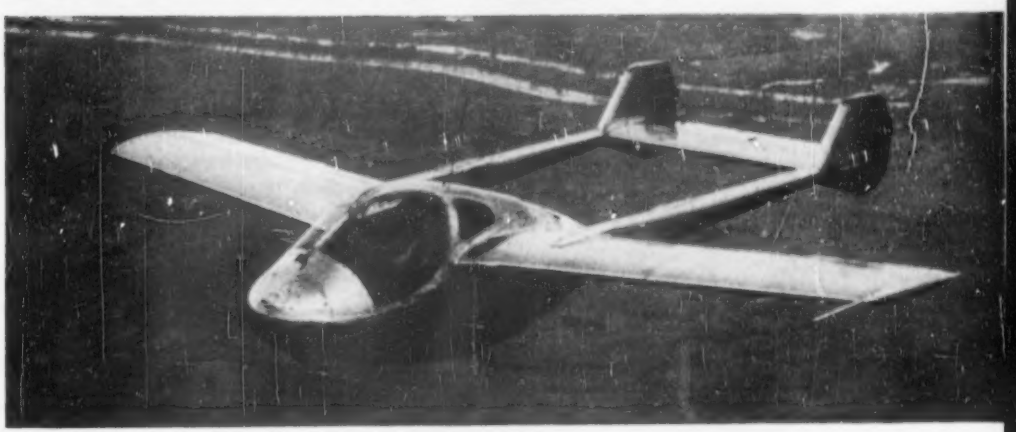
French Show New Planes At Paris

TANK FIGHTER—Potez 75 twin-boom pusher (right) was one of new planes on which data were released during the Paris Air Show June 26-July 5. It is heavily armored for protection against light ground fire and is designed to carry rockets and air-to-ground guided missiles. Piston engine is 450-hp. Potez. Gross weight is 5,280 lb., cruising speed, 147 mph. and range, 270 mi. Plane has fixed tricycle landing gear and enclosed cockpit ahead of open pilot's "office."

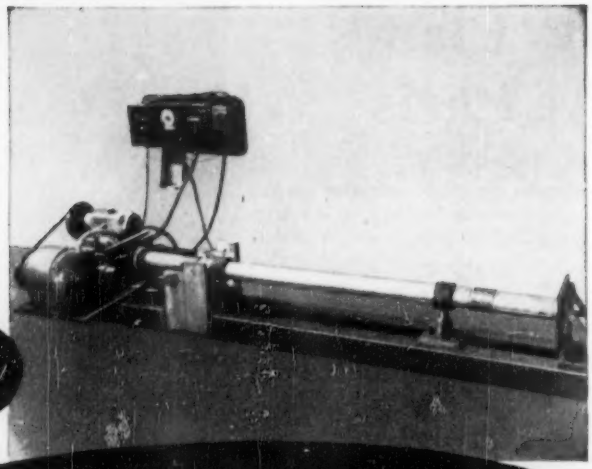


JET TRAINER—Two-place side-by-side Morane Saulnier M.S. 755 (left), scheduled for display at Paris Air Show, is being considered for production for French air force. It is powered by two Turbomeca Marbore turbojets of approximately 880 lb. thrust each. Two machine guns are fitted for training. Landing gear is of retractable tricycle type. Note the T-tail. Main fuel tanks are located below the turtledeck behind the cockpits. Gross weight is approximately 5,900 lb. Span is about 31 ft. 6 in. and length is approximately 32 ft. Auxiliary wingtip fuel tanks can be fitted. Note the drag brakes extended on upper surfaces of wings near the fuselage.

ET LIGHTPLANE—Flight view of ipa S. 200 Minijet (right) details twin-oom configuration of tiny two-seat raft. Large expanse of transparent rea and position of cabin enhance for-ard visibility. Powerplant is Turbo-ieca Palas of 330 lb. thrust which gives he plane a top speed of 267 mph. Gross weight is 1,606 lb., empty weight 869 lb. Wingspan is 23 ft. 6 in., ngth is only 17 ft. Total wing area is 5 sq. ft. Flight tests of the plane, hich began in January 1952, have roved successful and the plane is lanned for mass production for private nd training uses. It has retractable tri-vcle landing gear, all three wheels fold-ng up into the fuselage.

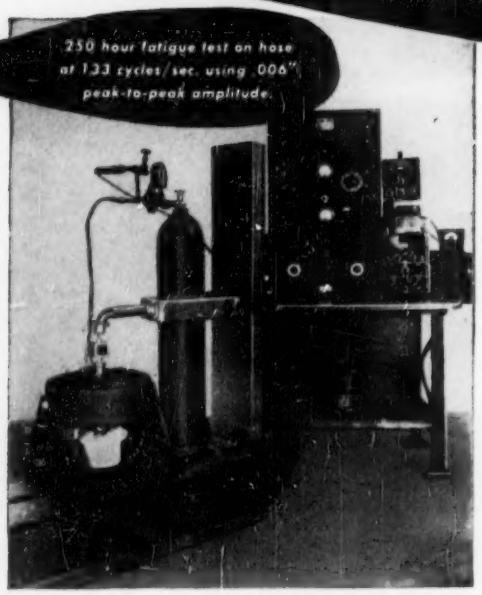


NEW PISTON TRAINER—Farman Monitor (left) is a new two-place tandem trainer prototype of conventional design powered by the Salmson Argus engine of 240 hp. It is one of two entrants in a trainer competition; the other is the Nord 3200. Landing gear is fixed. Monitor construction is metal with fabric covering.



15 hour fatigue test on RF-40 at 2" radial motion, frequency 60 cycles/min. Assembly at 200 psi, 580° F.

Rigid laboratory tests like these prove the ability of FLEXONICS FLEXIBLE METAL AIRCRAFT COMPONENTS to withstand flight conditions



250 hour fatigue test on hose at 133 cycles/sec. using .006" peak-to-peak amplitude.

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Flexible metal hose

Expansion joints

Aircraft components

Metallic bellows

WHO'S WHERE

In the Front Office

John A. Cunningham has been appointed vice president-operations of Pacific Northern Airlines.

Sir Hudson Fysh, board chairman and managing director of Qantas Empire Airways, has been appointed a director of British Commonwealth Pacific Airlines.

H. B. Obermiller has been elected treasurer of Airborne Flower and Freight Traffic, Inc., San Francisco. New appointments: **Donald I. Babcock**, assistant to the president, and **Earle T. Parrish,** comptroller.

Changes

Harley M. Thorson has been promoted to assistant to vice president-operations of Northwest Orient Airlines.

Alexander Yorinks, former mechanical engineering supervisor at Airborne Instruments Laboratory, Inc., Mineola, N. Y., has joined Trans-American Precision Gear Corp., Flushing, N. Y., as director of engineering.

William R. Spencer has been promoted to publicity director of Continental Air Lines.

William K. Lazzerini has been named purchasing agent for Slick Airways, succeeding **Roy L. Herold,** who resigned to direct purchasing for Civil Air Transport. **John L. Higgins** is Slick's new assistant general sales manager.

Charles S. Mohaupt has been appointed acting technical superintendent of the Aeronautical Manufacturing Div., B. F. Goodrich Co., Akron.

Morrough P. O'Brien, on leave from his post as dean of the College of Engineering, University of California, Berkeley, has joined General Electric Co. as consulting engineer to the Aircraft Gas Turbine Div., Cincinnati.

Bruce H. Atwater, former vice president-sales of Pacific Airmotive Corp., has joined Inet, Inc., Los Angeles, as sales manager.

Richard L. Dobie has been named assistant to the general manager-ground services of United Air Lines. **Miss Helen Olson** is new director of women's activities.

Harold Stover has been granted a leave of absence from Douglas Aircraft Corp. to become system maintenance manager for Philippine Air Lines. Other PAL changes: **John Kinkade,** manager of Engineering and Technical Div.; **Alex Ojeda,** assistant E&T manager; **Luis Fuentes,** assistant system maintenance manager; **Jose Castaneda,** supervisor of aircraft overhaul.

S. S. Wallace, Jr., has resigned as chairman of the South Carolina Aeronautics Commission to resume his duties as manager at Greenville (S. C.) Municipal Airport. **Charles B. Culbertson** is new chairman.

Honors and Elections

Charles F. Irons, Air Associates, Inc., Chicago, and **Fred D. Morrison,** Champion Spark Plug Co., Toledo, have been elected directors of Aviation Distributors and Manufacturers Assn.

INDUSTRY OBSERVER

► Aircraft manufacturers are competing in two new USAF design contests —one for a low-level strategic bomber and the other for a new jet tactical bomber. Glenn L. Martin Co. and Douglas are leading the pack.

► USAF, Republic and Wright are working on a "crash" program to iron out development difficulties with the J65 Sapphire turbojet and the F-84F Thunderstreak, which it powers. USAF and company pilots and technicians are working a 'round-the-clock schedule at Edwards AFB to develop and test fixes on both the engine and the aircraft control system.

► USAF finally has admitted that there is such a thing as the Republic F-103 fighter. Col. J. Witsett, Air Materiel Command, made the slip before the House Appropriations Committee when he said USAF was studying the spares requirements for an F-103 production program.

► USAF leaders testifying on Capitol Hill said current production plans call for North American to build 25 F-100 fighters a month but that this easily could be expanded to 50 planes a month if necessary. They also said F-100 flew eight times the first week it was tested at Edwards AFB by George Welch, company project pilot.

► McDonnell is scheduled to build RF-101, a photo-reconnaissance version of the F-101 long-range strategic fighter. The new USAF fighter also is a good bet for modification to carry small atomic bombs.

► Big reason behind USAF decision to proceed with large-scale production on the Boeing B-52 Stratofort bomber is the surprising performance of the two flying prototypes. The two prototypes are powered by eight 8,700-lb.-thrust versions of the Pratt & Whitney J57 turbojet, but production B-52s will utilize a 10,000-lb.-thrust version of the J57. Prototype B-52s using the lower-powered engines have speed performance equal to the best contemporary fighter.

► U. S. Marine assault version of the new Sikorsky S-56, to be designated HR2S, will be equipped with nylon-construction flak curtains hanging from the sides of the copter as a protection against ground fire. Meanwhile, Navy statistical analysis of exposure on an assault helicopter mission, coupled with tests of rotor blades and other vulnerable components, indicates that assault copters are no more vulnerable than assault boats and may be less so.

► Pratt & Whitney Aircraft's turboprop PT2F-1, 5,600-hp. commercial version of the T-34, had its first foreign showing at the Paris 20th International Air Show, June 26-July 5. It was recently released by Navy for foreign and domestic airline sales.

► Contrary to some hasty industry assumptions made after American Airlines president C. R. Smith's speech favoring turboprop transports, AA still is taking a realistic look at both sides of the jet vs. turboprop transport question. Inadequate or unsatisfactory military experience with existing U. S. turboprops and lack of high power that can compete against today's 10,000-lb.-thrust turbojets are factors in the ultimate decision.

► Sources close to North American Aviation say deliveries of first production models of the new F-100 Super Sabre jet will begin this fall. Plane is powered by the Pratt & Whitney Aircraft J57 turbojet, has 45-deg.-swept wings and is expected to operate at supersonic speeds in level flight.

► Another facet in the developing air power conflict between Army aviation and USAF is the competitive role both services are taking in development of Japan's air power. Army is training some Japanese students for the future JAF in a special staff school at Ft. Benning, Ga.

► American Helicopter's XH-26 pulsejet rotor copter will start delivery with two to the Air Force for testing at Edwards AFB, Calif., in September, followed by two to the Army at Ft. Bragg, N. C.

Washington Roundup

Production Slowdown?

Defense Secretary Charles E. Wilson talks of "speeding up" aircraft production and "making" manufacturers meet schedules, but the prospect increases that a major slowdown will get underway before long.

The most optimistic Administration estimate now is a $5.6-billion budget deficit for fiscal 1954 and this assumes continuation of the excess profits and other taxes asked by the President. There will be heavy Administration and congressional pressure on Wilson to help narrow the deficit gap by holding Air Force aircraft procurement below the $6.3-billion "minimum" estimate for present delivery schedules.

Concern over the fiscal 1955 USAF aircraft spending picture is even greater. Under present delivery schedules, it will shoot up to $8.9 billion—$2.6 billion more than 1954. A production slowdown would remove this additional roadblock to tax reduction.

$17-Billion-a-Year USAF?

The 143-wing USAF program, up for reconsideration by the new Administration, has an important strike against it: It will cost $16.8 billion a year to maintain. Top Republicans would like to level off defense spending approximately at $25 billion a year for the long mobilization period ahead. Without deep slashes in Army and Navy strength, the 143-wing program won't fit under this ceiling. Cost of maintaining the 120-wing force after it is achieved: $14.6 billion. Some key congressmen think even this is too big an annual USAF spending bill.

Talbott vs. Wilson

USAF Secretary Harold E. Talbott is taking a middle path between Secretary Wilson and Gen. Hoyt S. Vandenberg in the fight over the Air Force program.

In congressional testimony, Talbott:

- Supported Wilson's plan for a review of the 143-wing program, as well as other military programs. Vandenberg said it was unnecessary because the Joint Chiefs of Staff endorsed the program only a few months ago.
- Hinted that he thought the review should confirm the 143-wing program: "I am satisfied that, insomuch as (the 143-wing program) was arrived at by the Joint Chiefs of Staff after long study as our requirement . . . there have been no changes in world affairs that will reduce that requirement."
- Balked at supporting Wilson's $5-billion USAF budget cut. He recommended a $1.6-billion cut in the $16.8-billion Truman USAF budget, resulting from studies initiated by former USAF Secretary Thomas Finletter. "But when you say a $5-billion cut," Talbott commented, "we would like to see our Air Force budget higher than it is, surely. We would feel a little bit more comfortable with the task which is put before us."
- Thought that personnel and base construction restrictions clamped on by Wilson had "impaired—but not substantially"—the buildup.

Twining Favors Review

Taking issue with his predecessor, Gen. Vandenberg, USAF's new Chief of Staff, Gen. Nathan Twining, firmly is supporting the reconsideration of the 143-wing USAF program.

He testified at a congressional session: "I feel that the forces of the three services should be looked at very critically and as promptly as possible to come up with the solution as soon as we can. What the force should be, I could not say. Maybe it is more than 143 wings, or maybe it is less. . . . I think we will end up with a proper force."

Wilson and Radford: More Power

Secretary Wilson and Adm. Arthur Radford, incoming chairman of the Joint Chiefs of Staff are armed with increased authority to give strong-man direction to the defense program.

A House move to kill the defense reorganization plan flopped. The plan was drawn to give the chairman firm control over the JCS and the Secretary firm control over the entire defense establishment.

Basic policy of the reorganization: abolish overall "boards," composed of representatives of all the services, replace them with assistants in the Office of the Secretary accountable for the various programs crossing service lines.

Six More Secretaries

The six new Assistant Secretaries of Defense, soon to be named, will give the Wilson-Kyes team a total of nine to help direct the defense program. It will boost the total of Secretary-level officials at the Pentagon to 23.

Among the new officials will be assistants for:

- **Research and development.** To take over the responsibility of the abolished Research and Development Board, hampered in taking quick, decisive actions by the "board" organization (two representatives from each service) and inclined to compromise.
- **Applications engineering.** To direct the materiel area between R&D and quantity production of weapons.
- **Properties and installations.** This assistant will have authority over public works and maintenance of government facilities in operation and standby status.

Government Airline?

The odds seem to be that Military Air Transport Service will be taken out of the Air Force and set up as an independent organization operating on a business-like revolving-fund basis, after the pattern of the Military Sea Transport Service. Assistant Defense Secretary W. S. McNeil has long wanted to make the change in MATS status but has been blocked by the Air Force. Now House Appropriations Committee is putting the heat on.

Distribution of MATS costs to six different appropriation items, the committee complained, "has resulted in a deficiency in effective management, effective fiscal control, and in a practical impossibility for proper evaluation of this service either by the top officials of the department or the Congress. . . . The service should be placed on a business-like basis similar to the Military Sea Transport Service."

Airline spokesmen are wary that an independent MATS might develop into a competitive operation. They are even more apprehensive that it might lead to a merger of MATS and MSTS—recommended last year by a House subcommittee.

—Katherine Johnsen

AVIATION WEEK

VOL. 59, NO. 1

JULY 6, 1953

Air Force to Get 8,800 Planes in 1953

- **Budget hearings reveal production figures.**
- **Military aircraft orders since Korea: 30,323**

By Robert Hotz

The aircraft industry is scheduled to deliver 8,800 aircraft totaling 118 million airframe pounds during 1953 under the Air Force production program, according to Lt. Gen. Orval Cook, Deputy USAF Chief of Staff for Materiel.

Gen. Cook and other high-ranking USAF staff officers presented an amazingly detailed picture of military aircraft production during testimony before the House Appropriations Committee on the fiscal 1954 defense budget. The testimony was made public last week after having been screened for security.

► **30,323 Aircraft Ordered**—Since the beginning of the Korean war, USAF has ordered 21,527 planes and the Navy has ordered 8,796 for a grand total of 30,323 aircraft put on the industry's backlog since June 1950. Of the USAF total, some 5,722 planes have been delivered and 15,805 still are on order. In addition to the 15,805 planes still on the USAF schedule, a total of 2,162 additional planes will be financed from the reduced fiscal 1954 procurement request of $3 billion. Navy plans to buy 1,332 planes from its fiscal 1954 budget.

Gen. Cook cited the following figures for USAF deliveries by calendar years:

- **1951—4,148 aircraft** totaling 40 million airframe pounds.
- **1952—6,793 aircraft** totaling 88 million airframe pounds.

Monthly production rates for USAF have risen as follows:

- **December 1950—150 aircraft** totaling 2 million pounds.
- **January 1952—471 aircraft** totaling 5 million pounds.
- **December 1952—670 aircraft** totaling 8 million pounds.
- **March 1953—719 aircraft** totaling 9 million pounds.

Department of Defense offered the following monthly rates on Navy aircraft deliveries:

- **December 1950—78 aircraft.**
- **December 1952—243 aircraft.**
- **March 1953—264 aircraft.**

► **USAF Needs**—Cook said the Air Force needs a monthly production rate of 450 planes to maintain normal peacetime attrition for the 143-wing program, but actual production schedules based on fiscal 1954 money called for a rate of only 325 planes monthly by January 1956, of which only 200 a month would be delivered to the Air Force. He said this was being done deliberately because of the necessity of bringing several new types of aircraft into production out of fiscal 1955 funds.

Under present delivery schedules USAF deliveries were planned to reach a peak of 730 per month in March 1954 and then taper off to 500 planes a month by mid-1955 and 200 a month by the middle of 1956.

Col. Charles L. Davis, Chief of the Aircraft Production Control Branch of the Air Staff, testified that during the fiscal year ending June 30, deliveries to USAF were expected to total 4,691 air-

USAF and Naval Aviation Obligations

Following is a detailed breakdown of estimated obligations for the 1954 fiscal year, which started July 1, comparing the Administration's defense budget with estimated obligations under the Truman budget and 1953 fiscal year obligations. The estimates are subject to cuts or additions made by Congress.

AIR FORCE	1953 FY Obligations	Truman Budget	Eisenhower Budget
(1) Aircraft and related procurement	**$10,166,797,349**	**$6,131,400,000**	**$4,269,266,000**
This includes—			
(A) Complete aircraft	6,865,826,499	.....	2,265,026,000
(B) Initial spares and parts	2,091,200,544	.....	997,270,000
(C) Related procurement (including industrial machinery, training items, preproduction costs, service test materiel)	868,326,490	.....	609,620,000
(D) Modification of in-service aircraft and equipment	271,233,359	.....	320,590,000
(2) Guided missiles	**383,182,472**	**527,000,000**	**543,000,000**
This includes—			
(A) Complete guided missiles	215,760,213	.....	254,694,000
(B) Initial spares and parts	22,670,908	.....	13,148,000
(C) Preproduction planning and facilities	43,515,648	.....	40,906,000
(D) Modification and modernization	3,918	.....	12,682,000
(E) Auxiliary equipment	27,245,686	.....	82,926,000
(F) Aerial targets	73,986,000	.....	644,000
(3) Industrial mobilization	**3,902,597**	**5,600,000**	**9,925,000**
(4) Maintenance spares and parts	**974,284,000**	.....	**825,581,000**
(5) Research and development	**554,403,317**	**537,000,000**	**483,862,000**
This includes—			
(A) Aircraft	53,648,603	28,153,000	48,381,000
(B) Guided missiles	139,383,519	158,703,000	134,388,000
(C) Propulsion	91,001,537	112,275,000	83,269,000
(D) Electronics	87,891,056	74,130,000	73,334,000

NAVAL AVIATION	1953 FY Obligations	Truman Budget	Eisenhower Budget
(1) Aircraft procurement	$3,299,995,648	$2,000,437,000	$1,253,000,000
(2) Guided missiles and target drone procurement	152,800,000	172,170,000	104,000,000
(3) Guided missile outfitting	15,250,000	21,867,000	11,127,000
(4) Research and development	175,000,000	199,000,000	175,000,000
(5) Aircraft modernization	19,168,000	53,939,000	35,412,000
(6) Industrial mobilization	4,740,000	2,416,000	2,016,000

craft. Delivery figures cited earlier for the calendar years were total USAF production program figures and included planes bought by USAF for the Army, Navy and Mutual Defense Assistance Pact.

USAF actually got only 6,300 planes of the 8,800 in calendar 1953 schedules. For fiscal 1954, ending next June 30 USAF expects to get 7,350 planes, and 6,000 planes in fiscal 1955, ending June 30, 1955.

Thus the aircraft industry is expected to deliver 13,350 planes to USAF alone during the next two years in addition to those scheduled for MDAP, Navy, Army and Marines.

▶ **Budget Blow**—The 120-wing program, toward which USAF is building under the Republican defense budget, requires 25,400 aircraft. Maj. Gen. Oliver Picher, Air Staff programming expert, testified that all funds required for aircraft needed in the 143-wing program had been appropriated by the end of fiscal 1953 except for four wings of tactical bombers. These four wings had not been financed because the Douglas B-66 was not ready for procurement in fiscal 1953.

This admission was a severe blow to USAF hopes for an increase in fiscal 1954 procurement funds and undoubtedly stimulated the House committee to recommend further cuts.

Picher also testified that USAF losses in the Korean air war have been the equivalent of six fighter wings.

▶ **Figures Challenged**—Air Force officers took sharp issue with the Defense Department figures purporting to show a 22% slippage in USAF production schedules during the last calendar year (AVIATION WEEK June 8, p. 94). They said the 22% slippage was on planes delivered to the Air Force alone and did not recognize deliveries to MDAP, which were part of the USAF production program. MDAP deliveries were 108% of schedule, and USAF deliveries were 78.5%, making a total slippage of 14.5%, not the 22% cited by the Defense Department.

The air officers testified that USAF was required to give MDAP first priority on aircraft where the same type was being delivered to both forces.

They also challenged lead times used in a Department of Defense memo purporting to show USAF was overestimating its reorder lead times (AVIATION WEEK June 8, p. 94). USAF quoted a current reorder lead time of 21 months for the Boeing B-47 in contrast to 26 months cited by Defense and 16 months on the Lockheed T-33 trainer in contrast to 23 months cited in the Defense memo.

These officers pointed out that before the Korean expansion USAF had used a reorder lead time of 18 months, but that it had been increased to 24 months during the Korean crisis. Actual experience since then has shown that expenditures for aircraft have lagged about 24 months behind appropriations. Now, however, USAF feels it can reduce some of its reorder lead time to 18 months again.

As a result of this reduction, it has postponed financing of some 708 aircraft originally scheduled for fiscal 1954 into fiscal 1955.

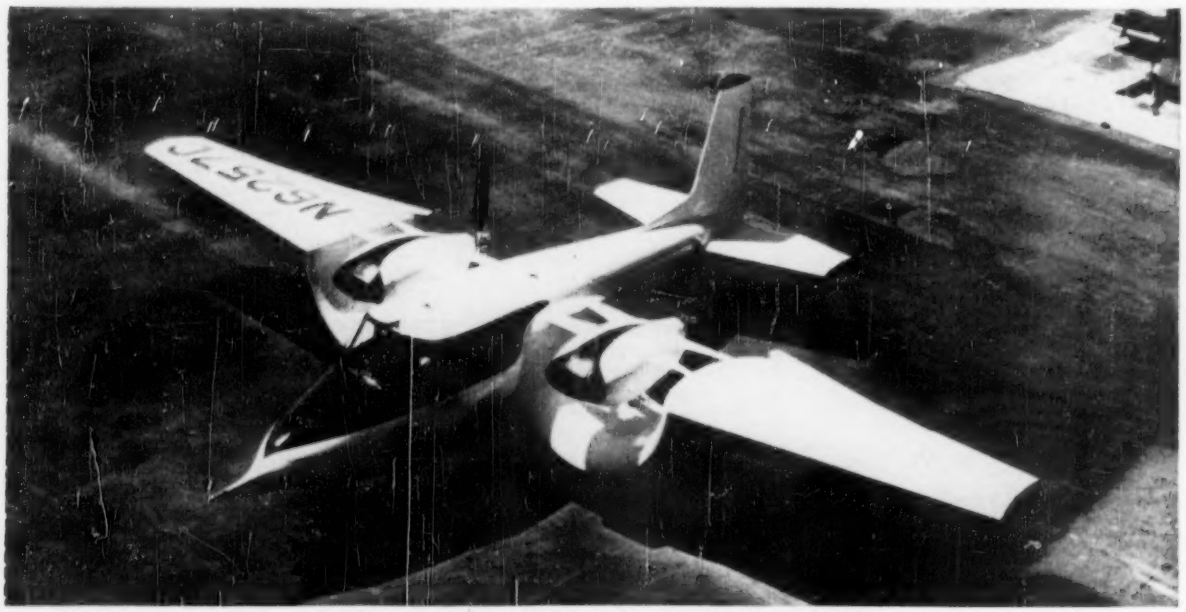
▶ **T-36A Canceled**—USAF officers testified they canceled an order for 420 twin-engine T-36A trainers, to have been built by Beech Aircraft of Wichita and Canadair of Montreal, because cost of the airframe had risen too much over original estimates and because of a reduced training requirement as a result of cutting pilot training from a 12,000 annual rate to 7,200. Two Beech T-36 prototypes will be built.

USAF officers also said the proposed jet conversion (T-36X) of the trainer did not appear to be advisable.

The Chase C-123B order was reduced from 244 aircraft to 165. Eight KC-97Gs were also cut from the program because of reduced B-47 refueling requirements.

▶ **Industry Expansion**—There will be some continued expansion of the aircraft industry facilities during the next six months, with sizable additions of tooling at Convair-San Diego for F-102 production and at Douglas-Long Beach for B-66 production.

There still are some special-purpose machine tools in short supply and a total of 10,000 additional machine tools is required to complete current industry expansion, according to USAF.



BAUMANN BRIGADIER DONS CHANNEL WING

Here is first picture of the new Custer CCW-5, basically a Baumann Brigadier fitted with a Custer channel wing. The strange-looking five-place twin-pusher transport was photographed at Hagerstown, Md. Custer says purpose of this unusual wing configuration is to permit short takeoff and landing characteristics and near-hovering performance. Analysis of an NACA memorandum detailing findings of windtunnel tests of an earlier Custer channel-wing craft was carried in Aviation Week (June 15, p. 28). The new CCW-5 transport has been entered in the forthcoming England-New Zealand air race which starts Oct. 10.

No Truce in AF Budget Battle

House committee cuts an additional $240 million, but Truman, Symington and Yorty continue fight.

In the first showdown on aircraft cutbacks, Congress didn't stop at the line drawn by Defense Secretary Charles E. Wilson in slicing fiscal 1954 Air Force and Naval Aviation budgets.

House Appropriations Committee carved $240 million more from the USAF budget than was recommended by Wilson and $54 million more off the Naval Aviation budget.

▶ **Savings vs. Planes**—But in the face of the powerful House group's action, the fight for more Air Force money continued:

• **Former President Truman's** major public speech defending Gen. Hoyt S. Vandenberg's position on a 143-wing USAF helped force the issue into political straits.

Those who recalled Truman's scotching of the 70-group program over protests of Vandenberg and Stuart Symington, then Secretary of the Air Force, marked it down as pure politicking—tending to drive Republicans to loyal support of the Administration.

Money saved, Truman declared, "even though it is 'hard money,' won't knock any enemy plane out of the sky. . . . You can't balance, as if on a scale, the desirability of spending a few billion dollars against the desirability of surviving as a free nation."

• **Sen. Symington** launched a Senate drive for restoration of $1.4 billion of the $5-billion USAF slash made by Wilson with a full-dress floor speech (see page 16).

• **On the House side** Rep. Sam Yorty doggedly stuck to his campaign, concentrating on an attempt to pin the President down precisely on his position on the $5-billion USAF cut.

"I have never believed, cannot believe, and the record does not indicate that President Eisenhower was told specifically what the reduced defense budget would do to the Air Force when the overall defense budget was presented to him," Yorty declared.

His telegram to the President was answered in vague language by an assistant, but Yorty kept trying for an appointment with Mr. Eisenhower to discuss air power.

▶ **House Action**—Key actions taken by the House committee were:

• **Approved $500 million** for AF machine tool stockpile, as recommended by both the Truman and Wilson budgets.

• **Approved construction** of another Forrestal-class carrier out of Navy shipbuilding funds, which apparently takes the matter out of controversy. Last year, House Appropriations, where opposition to carrier aviation is strong, voted to ban construction of the third ship.

• **Went along with** Wilson's $3.5-billion allocation for USAF procurement of aircraft and related materiel—a $3.2-billion or almost 50% cut from the Truman estimate of $6.7 billion. USAF had $11 billion new money for fiscal 1953.

• **Trimmed $21 million** from the $1.4 billion allowed by Wilson for Naval aircraft and related procurement. The committee said it did this on the basis of a new Defense Department projection that incorporated a $21-million unobligated carryover into the fiscal 1954 program. The $1.4 billion (less $21 million) allowed is a reduction of slightly more than a third in the $2.2 billion recommended in the Truman budget. More than $3.9 billion in new money was provided for fiscal 1953.

• **Trimmed $35 million** more than recommended by Wilson off USAF's research and development allocation and $18 million more off Navy's Bureau of Aeronautics research and development program.

▶ **Expansion Brakes**—For the USAF program, the Truman estimate was $537 million and the Wilson estimate, $475 million. The committee cut to $440 million brought the amount of new money substantially below the $525 million provided in fiscal 1953.

Because of carryover funds, the committee pointed out that its cut "should not reduce the present level of effort on essential work, but nevertheless should tend to apply the brakes on further expansion." The committee said that "a little tightening of the purse strings should have a salutary effect—perhaps with a new look, the anticipated level of activity can be reduced even further next year."

The $157 million in new money for Naval Aviation research and development allowed by the committee is below the $175 million provided in fiscal 1953. The Truman budget proposed $199 million, and Wilson asked for $175 million.

For military personnel—which General Vandenberg reports is now the bottleneck in the USAF program—the committee clipped $30 million off the $3.3 billion recommended by Wilson.

▶ **Fund Slicing**—The defense budget of the House Appropriations Committee does not include money for USAF public works, which will be taken up later. For this, the Truman budget included $700 million and the Wilson budget $400 million.

The total defense budgets (exclusive of the USAF public works item) are:

• **Truman budget:** $40.7 billion.
• **Wilson budget:** $35.8 billion.
• **House committee budget:** $34.4 billion.

The Air Force budget, largely because Wilson already had pared it sharply, fared best in the House committee. Compared with the $240-million USAF cut, the group cut Navy $398 million and the Army $689 million.

This is how the committee sliced funds among the services:

• **Army:** $12.9 billion.
• **USAF:** $11.0 billion.
• **Navy:** $9.3 billion.

This is approximately the same relative apportionment as under the Wilson budget: Army, $13.7 billion; USAF, $11.3 billion; Navy, $9.7 billion. The Truman budget put strong emphasis on air strength: USAF, $16 billion; Army, $12.1 billion; Navy, $11.5 billion.

Floberg Successor?

Likely successor to John F. Floberg, Assistant Navy Air Secretary, is James H. Smith, one-time vice president in charge of Pan American World Airways Atlantic Division. Smith was a Naval aviator during World War II.

Floberg has been known to be interested in returning to private law practice in Chicago but was asked to remain at his post by Defense Secretary Charles E. Wilson and Adm. Arthur Radford, soon to be chairman of the Joint Chiefs of Staff.

AF to Cut 42 Planes From Pacific Airlift

Pacific airlift by commercial carriers is slated for heavy cutback in the new Air Force budget submitted to Congress.

USAF plans to phase out 42 of the 54 planes on the West Coast-Tokyo run with priority cargo, passengers and patients. Total cost for fiscal 1954 is estimated by Air Force at $43 million, including continued operation of the 12 remaining planes and phaseout of the other 42.

Meanwhile, AF is continuing negotiations on terms for recall of the 37 DC-4s on lease to the airlines—some in airlift operations and some flying civilian schedules. Destiny of 90 C-46s still on lease to airlines remains unsettled (AVIATION WEEK June 22, p. 14).

Blast at Budget

- **Symington leadoff man in Senate defense debate.**
- **Former AF chief assails reasoning on cuts.**

Assistant Defense Secretary W. S. McNeil fed the $5-billion slash in Air Force's budget to Secretary of Defense Charles E. Wilson, who swallowed it "hook, line, and sinker," and the President is now supporting it because he doesn't "know what else to do," Sen. Stuart Symington declared in his maiden speech launching floor debate on the controversial defense cut.

The former Secretary of the Air Force charged the cut puts "figures above forces." Tracing the ups and downs of the USAF program from 237 groups during World War II to 38 in 1947, up to 59, down to 48 and, then to 42, Symington observed that "there might well have been no Korea" if the U.S. had a 70-group strength in 1950.

"If today we follow the military experts instead of the budgeteers," he said, "we may be able to avoid a far bigger war than Korea."

▶ **Party-Line Split**—The debate fell into the party molds. Sens. Lister Hill, Burnet Maybank, and other Democrats backed up Symington in his demand that the $1.4 billion requested by Gen. Hoyt S. Vandenberg be restored to the USAF budget.

It was challenged by the two key Republicans on the issue—Sen. Homer Ferguson, chairman of the Military Appropriations Subcommittee, and Sen. Leverett Saltonstall, chairman of the Armed Services Committee.

▶ **Two Theories**—Symington pointed to the two theories as to how the USAF slash evolved:

• **The "father knows best theory."** Under this, Symington said, "Secretary Wilson's public statements, so far as they are prepared in carefully worded sentences in advance, seek to give the impression that a careful process of computation of forces is what actually happened and that the budget is merely a reflection of President Eisenhower's personal strategic judgement."

But he discounted the validity of this theory on the basis of Wilson's impromptu observations. For example, at one hearing, Wilson said: "Think I had the greatest responsibility for" the $5-billion slash and pointed to Undersecretary Roger Kyes and McNeil as "the two men who had the most to do with it."

• **The "what else can I do theory?"** This theory, he said, "is that the money men of the Treasury and the Bureau of the Budget came to the conclusion that at least $5 billion had to be cut from the Department of Defense budget; that Secretary Wilson, new at the job, told his money man, Assistant Secretary McNeil, that a $5-billion cut had to be made, and told him to make it; that Mr. McNeil promptly imposed practically the whole cut upon the Air Force; that Secretary Wilson then swallowed this, hook, line, and sinker, knowing only vaguely what he was swallowing; and that now the Administration is stuck with the choice of supporting Wilson, right or wrong, or repudiating him."

SYMINGTON: Backs Vandenberg.

He suggested that the President is supporting the $5-billion slash only because "at this stage of the proceedings apparently it is felt that (repudiating Wilson) is politically impossible."

▶ **"Useless" AF**—The senator criticized McNeil for behind-the-scenes maneuverings against the Air Force and ribbed Wilson on General Motors Corp.'s failures to meet defense schedules.

"One of the most astonishing innovations now current in the Pentagon is the lengthy secret interviews given to carefully chosen newspapermen by the Defense Comptroller. Mr. McNeil reads from brochures marked 'top secret,' but he will not let the favored reporters take notes," Symington said.

"The first part of the briefings has to do with McNeil's advancing the idea that the Air Force still has more money than it can handle; also, that the Air Force has done nothing to reduce the lead time on plane procurement.

"Later, the apparent real reason for the briefings comes out. Mr. McNeil develops his opinion that, in effect, the Air Force is useless. He does this by emphasizing that the Air Force must rely on fixed bases, whereas Naval Air is always a floating reservoir of power."

Remarking that he intends to "promote" Naval Aviation as a senator, Symington raised this question: "How can the military establishment be even the semblance of good organization, with the comptroller, the money man, expounding at secret briefings theories of strategic military planning exactly opposite not only to the expressed opinions about air power of the Joint Chiefs of Staff but also contrary to the views of President Eisenhower himself?"

▶ **GM Slippage**—Pointing to Wilson's criticism of slippages in the USAF program and emphasis "over and over again that from here on out he intended to see that all schedules were met by all manufacturers," Symington suggested:

"If schedules are so important, why did not Mr. Wilson do something about it when he was president of General Motors just a few months ago? . . .

"Mr. Wilson did not tell about the long weeks, months and years it took for one of his subsidiaries, Allison Motors, to produce liquid-cooled engines during World War II. More recently, Allison has been causing further delay in aircraft schedules because of troubles it has had in the production of aircraft engines.

"Nor did Mr. Wilson tell the committee that, on one order his company took during the war for 25,000 airplanes, eight were built, and the entire order was canceled because of poor performance at heavy cost to the American taxpayer."

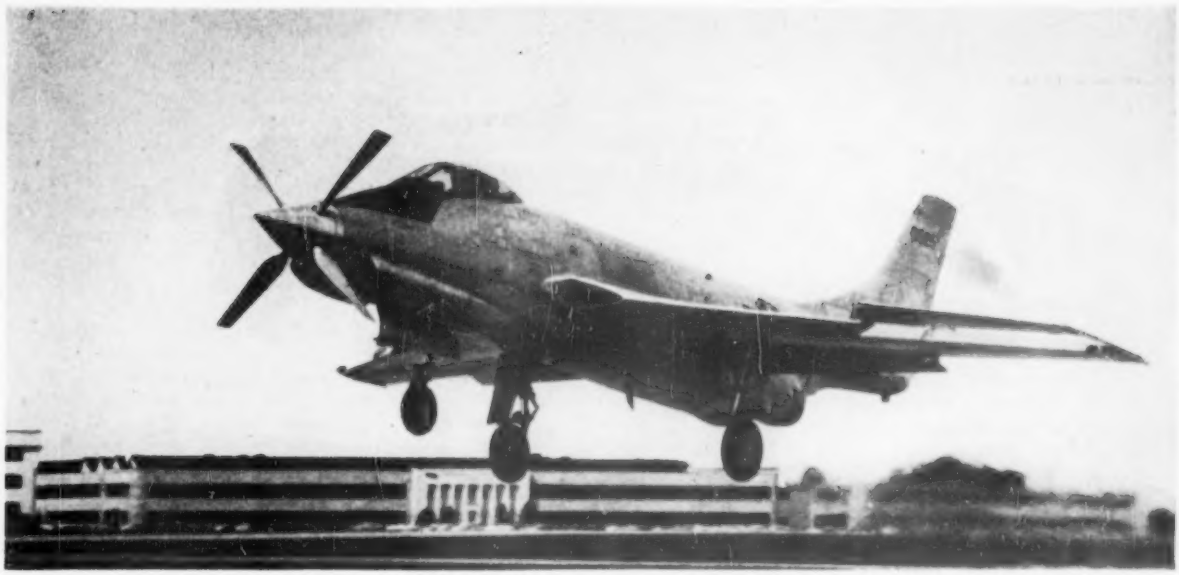
Harmon Awards

Mme. Jacqueline Auriol of France, Col. Bernt Balchen of the USAF, and Walter Massic, of Goodyear Aircraft Corp., have been named recipients of 1953 Harmon International Aviation Awards for their contributions during 1952. The awards are traditionally presented by the President of the United States at the White House in the Fall. The winners and their accomplishments:

• **Jacqueline Auriol, aviatrix,** for establishing a women's jet speed record over a 100-km. closed course at Istres, France, Dec. 21, piloting a Sncase-built Mistral fighter at an average speed of 534.375 mph.

• **Col. Bernt Balchen, aviation,** for work on air rescue, operations, pilotage and exploration in the Arctic regions.

• **Walter Massic, aeronaut,** for piloting and testing the Goodyear ZPN-1, at the time the world's largest non-rigid airship.



XF-88B Starts Supersonic Prop Tests

First flights of McDonnell's XF-88B, flying test bed for supersonic propeller research, mark tangible progress in the Air Force program to develop a turboprop ground-attack plane.

The test craft first flew Apr. 14 at Lambert-St. Louis Municipal Airport, and has startled observers by making takeoffs and landings with prop feathered (AVIATION WEEK May 18, p. 11).

Modified from the McDonnell XF-88A, the new version is powered by an Allison XT38 turboprop driving a Curtiss electric propeller. It retains the paired Westinghouse J34 turbojets of the original design.

The McDonnell test bed will share development duties with Republic's F-84H turboprop modification, expected to be in flight status soon at the Air Force Flight Test Center, Edwards AFB, Calif.

► **Test Bed Purpose**—The combination powerplant of the XF-88B will push and pull the plane at test speeds beyond the normal range of propeller operations. Propeller stresses, performance and engine operation will be recorded during the runs.

The propeller research program will be flown by the National Advisory Committee for Aeronautics at its Langley Field base after check flights have been completed by the contractor.

Twenty-seven test combinations can be studied in the XF-88B. It has three available propeller speeds, which will be tested with three sizes of props—about 10, seven and four feet in diameter. Two-, three- and four-blade propellers will be tested.

Initial flight testing phase will be with the 10-ft. props.

► **Design Changes**—The Allison turboprop engine is mounted on the left side of the plane. This location meant moving the nosewheel gear to the right. The cockpit had to be redesigned to include the extra engine controls and avionic equipment.

Additional air intakes on the nose provide engine inlet air (left side) and oil cooling air (right side).

Overall length of the modification is somewhat greater than the 55 ft. of the XF-88A, but weight is reduced from the 20,000-lb. level by removal of all armament and one fuel cell.

The overall project is being monitored by the propeller laboratory at Wright Air Development Center of the AF Air Research and Development Command. Navy's Bureau of Aeronautics supplied the XT38 turboprop and the six J34 turbojets which were needed for the test.

More Heavy Presses Head for AF Knife

Three or four more extrusion presses in Air Force's heavy press program last week appeared headed for Assistant AF Secretary Roger Lewis' paring knife.

The further cuts appeared likely after Air Force told manufacturers who have extrusion presses on order that they must either provide housing for the big presses in existing facilities or the machines would be eliminated from the program.

► **Talking Stage**—Firms affected are Kaiser Aluminum & Chemical Div., Reynolds Metals Co. and Harvey Machine Co. If Air Force goes through with the expected slash, all three firms will be completely out of the press picture.

Alcoa, Wyman-Gordon Co. and Curtiss-Wright Corp. would be the only remaining firms in the whole program.

In the 10-press revised program announced earlier (AVIATION WEEK June 29, p. 14) Kaiser was left an 8,000-ton extrusion press for its Halethorpe, Md., plant. An addition to the plant has been started to house the big extruder. But Kaiser has no room in its present facility for the press. This indicates the company may lose its Halethorpe press.

Reynolds Metals Co. is in a similar situation at its Phoenix, Ariz., plant. Air Force has been trying to persuade Reynolds to provide housing for at least one press. But Reynolds is reported uncertain whether it would be worthwhile to complete housing facilities for either of its two presses. Reynolds has a 12,000- and an 8,000-ton extruder on order. Harvey has ordered an 8,000-ton extruder.

The matter is far from settled at this point between the Air Force and the companies involved. It still is in the talking stage.

► **Basis of Know-How**—When USAF slashed the original 17-press program to 10, it instructed firms involved to put the uncompleted presses "in reserve stock" in case they might be used at some future date.

Initial cuts in the program were

made on the basis of the operating firms' experience in heavy press work and construction progress of extruders.

Should the new cuts be made, here is how the program would stand:

- **50,000-ton forge** by Loewy Construction Co., for Wyman-Gordon Co., No. Grafton, Mass.
- **35,000-ton forge** by Loewy for Wyman-Gordon.
- **50,000-ton forge** by Mesta Construction Co. for Alcoa, Cleveland.
- **35,000-ton forge** by United Engineering & Foundry Co., for Alcoa, Cleveland.
- **12,000-ton extrusion** by Loewy for Curtiss-Wright Corp., Buffalo, N. Y.
- **13,200-ton extrusion** by Schloemann Engineering Co. for Alcoa, Lafayette, Ind.

Kaiser Layoffs Worry Legislators

Michigan congressmen bore down last week on Secretary of the Air Force Harold E. Talbott to slow layoffs of C-119 production workers at Henry Kaiser's huge Willow Run, Mich., plant.

Just the week before, Kaiser told Air Force it would take only six weeks to phase out production of the 71 C-119 Flying Boxcars USAF told Kaiser it could complete shortly after it canceled the firm's contract. Fifty-five planes were completed when the cancelation order was announced.

▶ **Alarmed Employes**—Michigan unionists immediately were alarmed when the prospect of 10,000 workers being thrown out of jobs seemed imminent. They communicated their fears to their representatives in Congress, who took the matter to Talbott. He told them Willow Run's phasing-out would take at least three months.

The Michigan congressmen were headed by Sen. Homer Ferguson, up for re-election in 1954. He originally supported Defense Secretary Charles E. Wilson's plan to cut out second-source contractors, such as Kaiser, in order to economize defense production. His companions were Sen. Charles E. Potter, and Reps. George Meader and Charles G. Oakman.

▶ **C-123 "Handful"**—Word was awaited last week on what the Air Force would do about production of the Chase-designed C-123B assault transport. In canceling Kaiser's C-123 contract with the C-119, AF said "a handful" of C-123s would be built (AVIATION WEEK June 29, p. 16). How many a "handful" constitutes was questionable pending a top policy decision.

Who would build them was another policy question. Best bet was Convair, although both Temco Aircraft Corp. and Fairchild Engine & Airplane Corp. were in the running with Chase Aircraft Co., 49%-owned by Kaiser.

One thing was certain: Kaiser Motors Corp. wouldn't build them nor would they produce any more airplanes for Air Force. One spokesman called the Kaiser firm a "dead duck" as far as further USAF aircraft production was concerned.

▶ **Army Decision**—Meantime, Air Force and Army were bouncing the C-123 production contract ball back and forth across the Pentagon. Army had given AF the requirement for an assault troop-carrying transport capable of short-field landings. C-123 was ordered as the answer.

THE KAISERS: Out of the USAF picture?

Assistant AF Secretary Roger Lewis said: "The ball is now in the Army's court." Sources close to Army maintained that Air Force has been told the Army still wants the C-123 produced.

Chase stopped all work on the transport, and its subcontractors throughout the country were ordered to do likewise. Alarmed, Sen. Robert C. Hendrickson of New Jersey telegraphed Talbott of his concern for the time and money lost by cancelation of the C-123 contract.

Chase last week had laid off 1,000 workers in its Navy-owned plant at West Trenton, N. J.

▶ **Cancelation of "Convenience"**—Kaiser currently is machining forgings for Boeing Airplane Co.'s B-52 program and, under another subcontract with Lockheed Aircraft Corp., is building sub-assemblies for the Navy P2V patrol bomber. Under license from Curtiss-Wright Corp., the firm is also building the R1300 engine.

When Kaiser's C-119 and C-123 contracts were canceled, the firm employed 12,000 men and women on aircraft production at Willow Run in one-third of the total plant area.

One factor in the contract cancelation was the rapid employe turnover at the Michigan plant since Kaiser went into aircraft production. Another was the $3.5 million each month it costs to keep Willow Run open.

Kaiser never produced more than seven two-engine C-119s a month in a factory considered uneconomical unless aircraft production is counted by the hundreds per month. Air Force figures Willow Run is capable of producing 500 planes per month.

Talbott said the contract was canceled for "convenience" rather than "cause." He insisted there was no connection between the cancelation and the Senate Armed Services Investigating Subcommittee hearings, abruptly adjourned after news Kaiser lost the contract.

On the C-123 production question, Kaiser lost out partly because of its inability to agree with Michael Stroukoff, Chase vice president and chief engineer, on where to produce the C-123. Kaiser wanted to build the transport at Willow Run, while Stroukoff demanded it be produced in his new West Trenton plant being completed.

Air Force told the firms to agree or get out of C-123 production.

▶ **Respond to Call**—As Henry Kaiser saw his C-119 program doomed, he maintained that no one need worry about his company.

"Just give us a few hours, and Kaiser will be rolling merrily along again," he said.

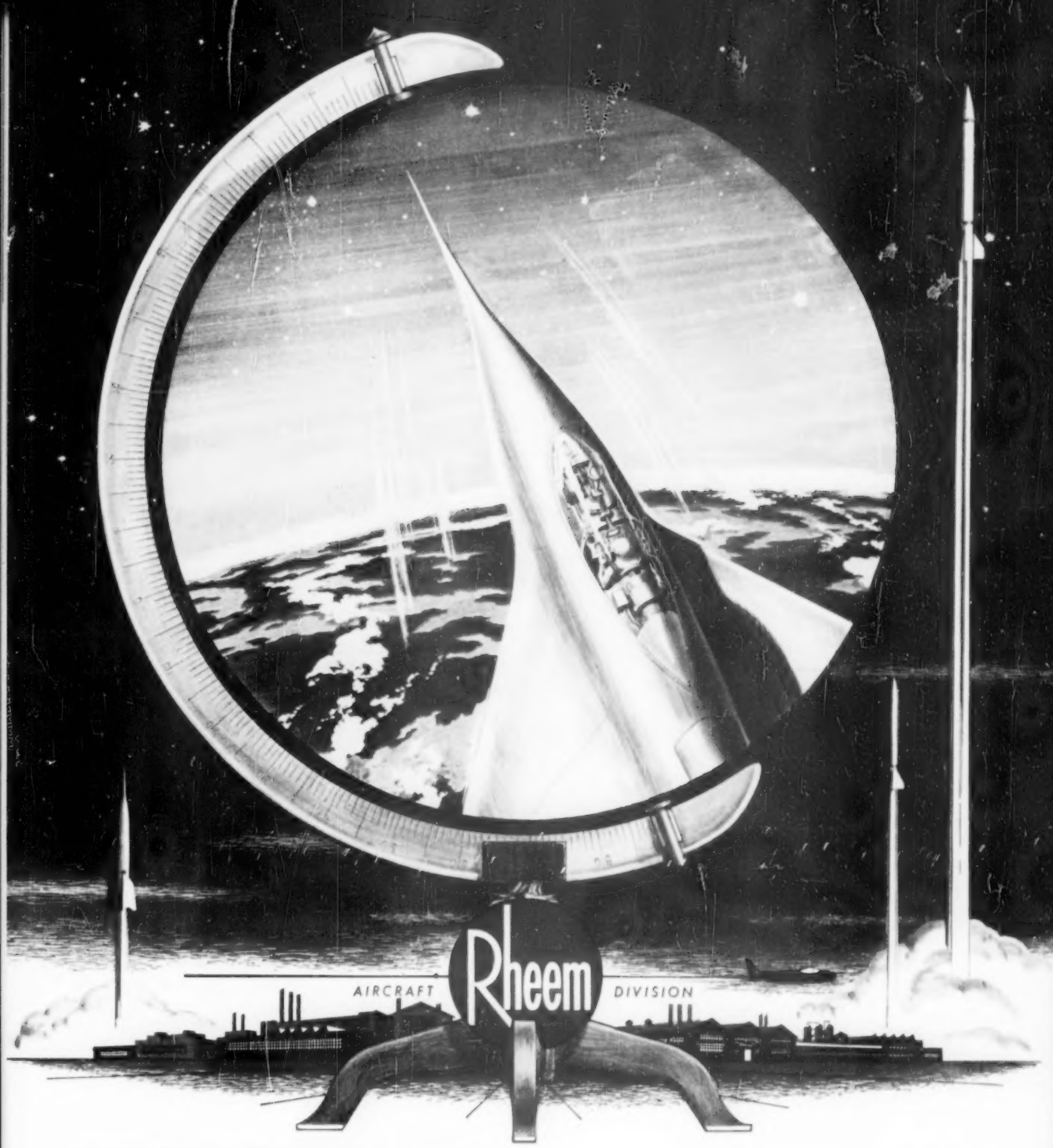
"Willow Run may be needed at any moment in any great crisis. It stands as a great living symbol to volume mass production, and it is an asset to this nation. Willow Run was brought to the threshold of being able to pour out great volumes of aircraft should an emergency have required. The nation has recognized that whatever the Kaiser organization has been called upon to do . . . we always have responded to the need and call," Kaiser said.

There was no word last week on whether or not the Senate subcommittee would resume its hearings on Kaiser's production record. Some Capitol Hill observers were betting that subcommittee chairman Styles Bridges had decided to end the Kaiser investigation.

PAL May Buy Copters

Philippine Airlines' varied and growing fleet may take on helicopters next. A company official reports the air carrier may buy Hiller Helicopters.

The company's fleet now stands at 35 DC-3s, 2 Convair 240s, 3 DC-6s and 3 DC-6Bs. PAL is converting its DC-6s to carry aircoach passengers forward, first-class with sleeper service aft. DC-6Bs were ordered this way in anticipation of trans-Pacific aircoach soon to be inaugurated.



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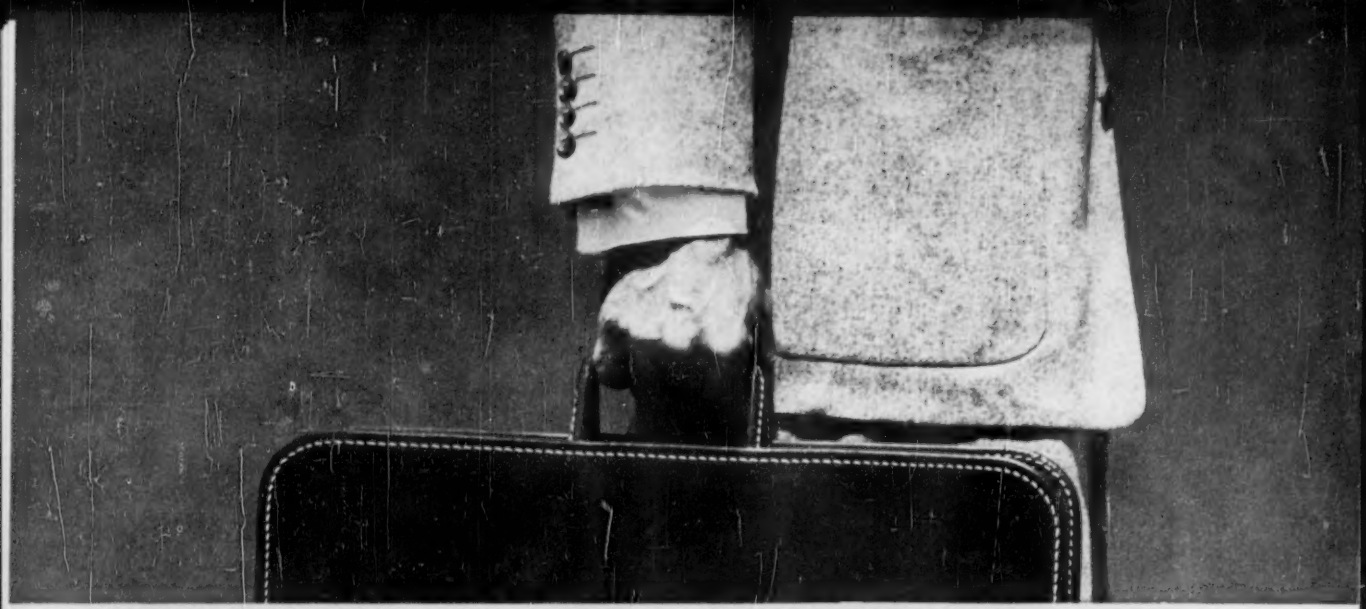

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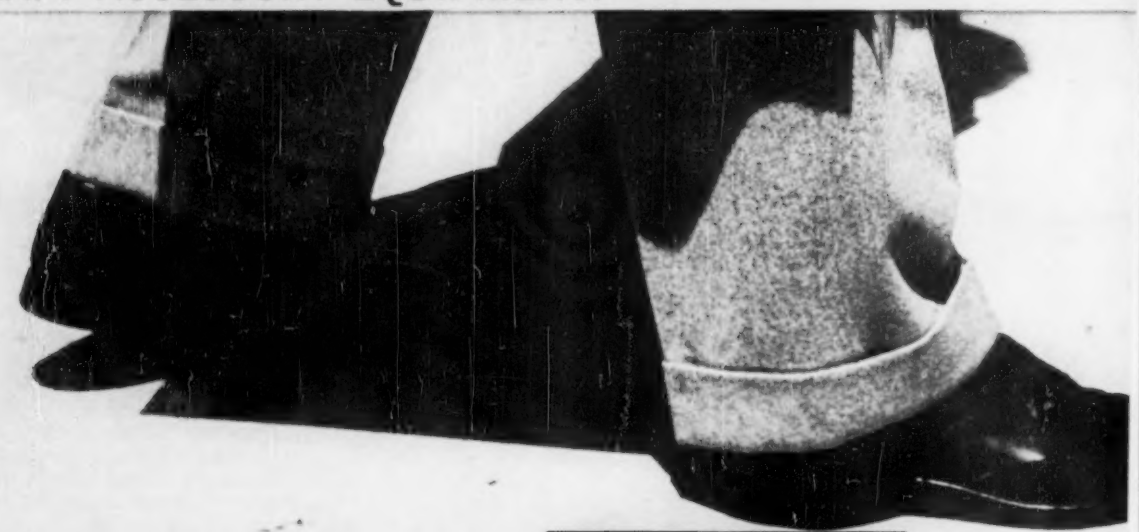

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Rescue Beacon Pinpoints Crash Victims

First U. S. details of operation of a new radio rescue homing device to guide air rescue planes to personnel lost in an ocean or untraveled land area have been disclosed by Simmonds Aerocessories, Inc., Tarrytown, N. Y., American licensee for the equipment.

Developed in England by Ultra Electric, Ltd., the device consists of a lightweight battery-operated radio beacon designed to be attached to life rafts or May West flotation gear. Homing equipment is carried in air or sea search-and-rescue craft.

▶**Military Tests**—The device has been named Sarah, indicating initials of search and rescue and homing (equipment). Grumman Aircraft Engineering Corp. has contracted for flight test of the first sets Simmonds will make in this country (AVIATION WEEK June 8, p. 10). The device already has been evaluated by Royal Air Force and demonstrated for U. S. Air Force, Army Field Forces and the Naval Air Test Center.

The Sarah equipment was designed to meet these requirements:

• **Facilitate rapid,** accurate search over wide areas under all visibility conditions.

• **Provide positive,** continuous directional information with constant or increasing accuracy as the search plane approaches wrecked personnel to pinpoint their location within a few feet.

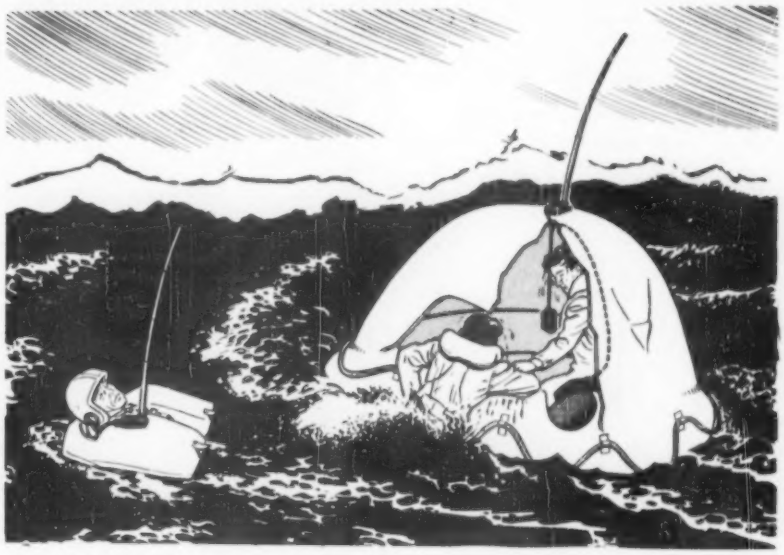
▶**66-Mile Range**—Equipment carried by the wrecked personnel includes the beacon, weighing 6 oz. with folding antenna; a 12-oz. speech modulator and receiver for two-way communication between wrecked personnel and plane, and a 32-oz. battery and 2-oz. cable. Total unit weight is 3¼ lb.

Beacon transmits a coded 243 megacycle pulse repeated in groups that may be spaced to permit identification of different downed personnel in the same area. This is radiated from the folding antenna, which when erected, transmits an omni-directional radiation in the horizontal plane and an inverted 30-deg. cone pattern vertically.

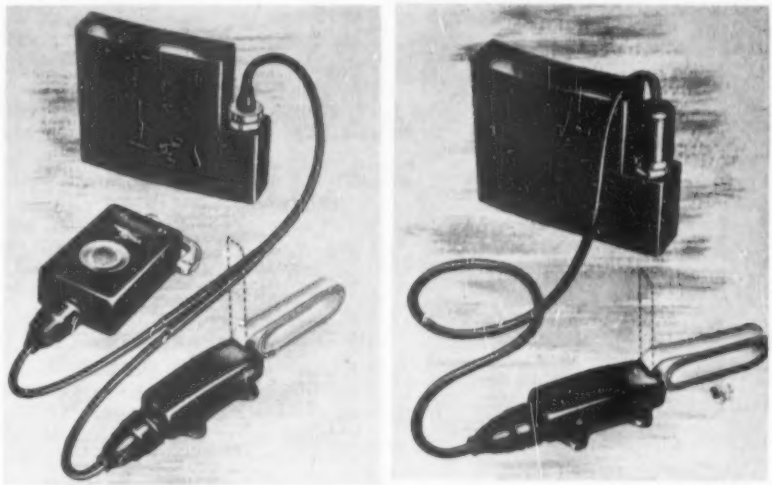
Peak power output of approximately 16 watts provides a maximum range of 66 mi. to a rescue plane at 10,000-ft. altitude and six mi. to a rescue ship, if shipboard receiver antenna can be elevated to a height of 30 to 40 ft. Battery capacity is adequate for 20 hr. of continuous operation.

At an altitude of 500 ft., the rescue plane can get a fix on the beacon that is accurate to within plus or minus 100 ft., adequate for pickup by helicopter or surface craft.

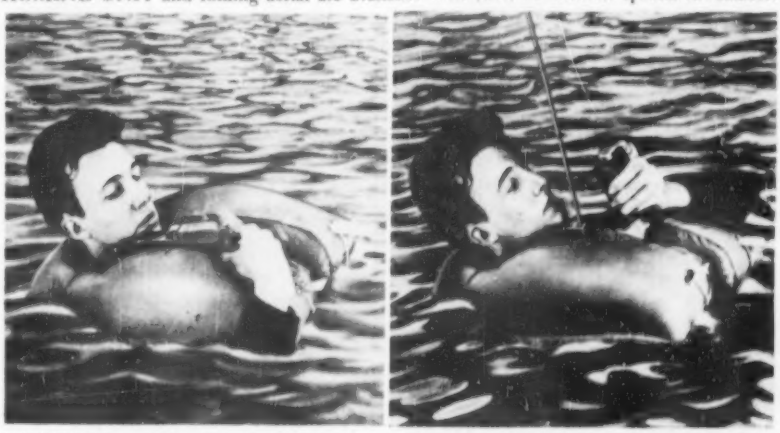
▶**Voice Transmission**—When the



DOWNED AT SEA, survivors in Mae Wests or on rafts signal search craft with Sarah.



HOMING UNIT and folding aerial are available with (left) or without speech modulator.



SURVIVOR switches to microphone . . . SENDS verbal directions to sighted plane.

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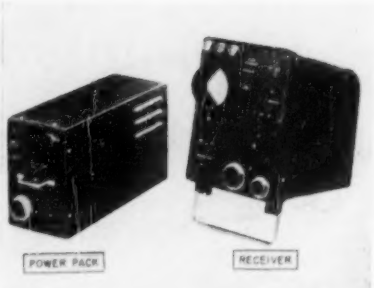


RECEIVING gear weight totals 24 lb.

wrecked person is within visual or audible range of rescue aircraft or ships, he may transmit voice by operating a three-position switch. However, peak power is about one-fourth that of the beacon mode and is only to be used when ranges are very short.

Selector switch is designed to require a definite effort to hold it in any position except beacon; and it is returned by spring force to that position as a safeguard against depression for long periods by confused or delirious wrecked personnel.

When the switch is turned to receive, a small signal from the receiver is sent on the beacon antenna, producing a display in the rescue craft showing the downed personnel are ready to receive voice instructions.

Current rescue receiving equipment carried by search plane or ship includes receiver, power pack, suitable search and homing and voice transmission antenna and interconnecting cable.

A new subminiaturized design being engineered will permit attachment of powerpack to receiver, making up a single unit. This will weigh 13 lb., compared to 24 lb. of present design.

▶ **Effective Search**—A cathode ray tube receiver shows the search area, with right and left antenna on the aircraft arranged so that beacon indications appear on either side of a vertical reference trace on the tube, providing directional information.

Right and left antenna patterns are inclined forward and overlap ahead, providing means for homing on the beacon as the airplane descends from search altitude. Other aids are an automatic scanning device and a stroboscopic control, which effectively shuts out all received signals except that selected for viewing.

When an airplane flies over the beacon, the signal suddenly vanishes due to the vertical radiation pattern of the beacon antenna—thus giving a fix.

A search plane, flying at 10,000 ft. and following the known bearing of the wrecked aircraft, would fly a parallel heading 50 mi. to one side of the downed plane's course and then return on the opposite bearing, flying 50 mi. to the other side.

Search thus would cover a band approximately 200 mi. wide on the course taken by the down plane, using maximum expected ranges of 66 mi. with a 16 mi. overlap at the center.

Canada Boosts F-86 Orders at Canadair

The Canadian government has placed orders for approximately 200 additional F-86 Sabre jet fighters with Canadair, Ltd., Montreal.

Part of the contracts were in final stages of negotiation when the U. S. canceled Beech T-36 trainer orders, including those placed with Canadair.

▶ **RAF Sabres**—One of the new Sabre contracts covers 120 Avro Canada Orenda-powered F-86s to replace a similar number of earlier planes diverted to the USAF. The other contract is for less than 100 General Electric J47-powered Sabres, which will be sent to Great Britain for use in the Royal Air Force.

A previous order for 370 Sabres for the RAF is being taken care of jointly by the U. S. and Canada, with the former paying for J47 turbojets and the latter for airframes.

▶ **Other U. S. Orders**—Canadian aircraft and parts plants still have U. S. contracts totaling $80 million, according to the authoritative Toronto Financial Post.

These include $7 million in Beech T-34 light trainers with Canadian Car & Foundry, Ltd., Montreal, and a number of L-20 Beaver liaison planes with de Havilland Aircraft of Canada, Ltd., Toronto.

Other awards have been placed with Sperry Gyroscope, Ltd., Montreal, for instruments; Canadian Pratt & Whitney, Montreal, for crankshafts and spare parts, and with the Aluminum Co. of Canada, Kingston, Ont., for aluminum forgings.

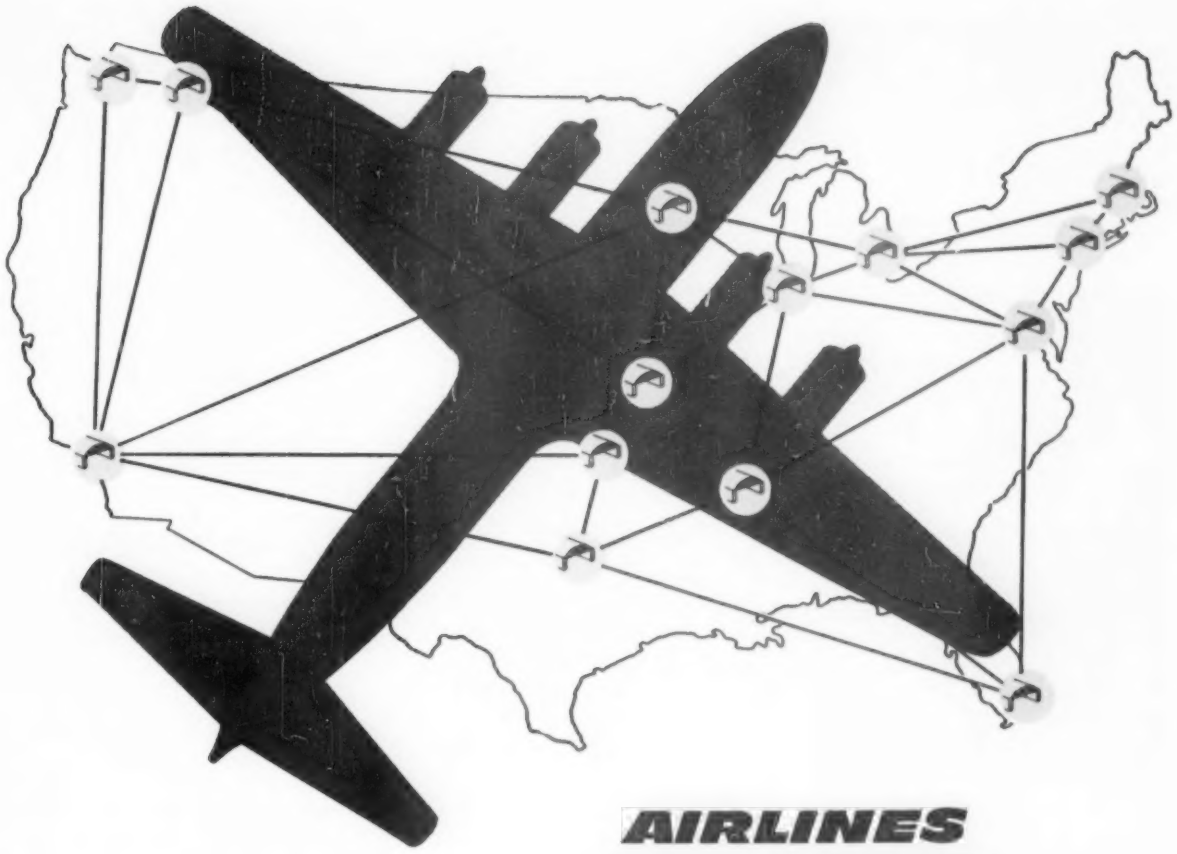
Talbott Pledges USAF Will Be 'Best'

Our Air Force "cannot and will not be second best," AF Secretary Harold E. Talbott has warned, because defeat is the fate of the second position in war."

Addressing a dinner honoring Leon Swirbul, president of Grumman Aircraft Engineering Corp., Talbott pledged that as long as he was head of the Air Force the U. S. aviation industry also would remain "best in the world."

"In my opinion," the Secretary said, "it is only to air attack that Communist Russia is vulnerable. Air alone offers the capability for effective action against the heart of the Soviet's war-making capacity."

▶ **Barrier to Attack**—Therefore, he



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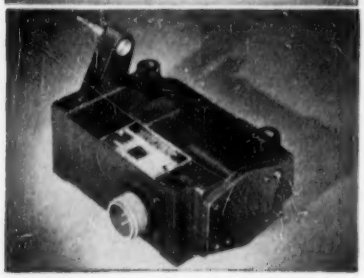

Airborne's geared magnetic brake is now available with an integral centrifugal brake to limit its speed and prevent overshooting. Designed to maintain any position within its travel range, the Model R-460 brake will hold a 200 lb. in. load, yet operate at less than 3 lb. in. when energized. A typical application is the centering adjustment of the bungee in the flight control system of a Piasecki Helicopter.

Small size and weight (2.3 lb.) make this brake unusually well suited to most aircraft. See the I.A.S. Aeronautical Engineering Catalog for dimensions of the R-460 or write us your requirements.

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added, we must have adequate air power. "As long as our aerial striking force is built and maintained as the strongest and best in the world no aggressor will dare attack us," he said.

"Rapid advances in air power development are the product of American industry and its know-how," he said. "Today we have technological advantages over the Communists. We have proof of this in Korea where our score in the air battle between our Sabre jets and the Communist MiGs has so far this year reached a 20-to-1 ratio."

Secretary Talbott asserted that the controversial Air Force budget cut is geared to permit a continued buildup of combat wings while at the same time reducing military expenditures.

▶ **Interim Program**—"Since the military budgets represent the largest share of our federal expenses," said Talbott, "it is only logical that they should be examined." That, he said, will be done by the new Joint Chiefs of Staff. Meanwhile an interim program goes into effect, to keep production rolling.

"We have already found some areas which are out of balance in which a savings can be made. I am sure that as our surveys progress we will find more areas where substantial savings can be made which will be applied to increase and improve our combat potential."

Talbott said USAF today contains 106 active wings, of which 93 contain sufficient men, equipment and aircraft to be considered operational. He praised men responsible for accomplishing this buildup "during a period of semi-mobilization" while maintaining fighting forces in Korea.

▶ **Tough Job**—Talbott called his new job "a great challenge, and I like it." He has found the job tougher than he was told it would be, he said, adding, "The assurance that it would require a bit of work was the understatement of the year."

Civil Aircraft and Engine Shipments

	April (1953)	March	April (1952)	Cumulative totals January-April (1953)	(1952)
Complete Aircraft	402	358	291	1,507	990
By weight of plane:					
Under 3,000 - lb. airframe weight	385	342	267	1,401	819
3,000 lb. and over	17	16	24	106	171
By number of places:					
1- to 5-place	385	342	267	1,401	818
Over 5-place	17	16	24	106	172
By total rated horsepower:					
Engines up to 399 hp	385	342	267	1,401	818
400. hp and over	17	16	24	106	172
Value of shipments of complete aircraft and parts (000 omitted)	$24,636	$19,280	$21,810	$93,405	$83,215
Aircraft	15,264	11,730	15,811	61,825	60,708
Aircraft parts	9,372	7,550	5,999	31,580	22,507
Value of shipments of aircraft engines and parts (000 omitted)	$13,044	$12,333	$13,806	$45,402	$49,968
Aircraft engines	5,471	4,107	4,559	15,622	14,924
Engine parts	7,573	8,226	9,247	29,780	35,044
Unfilled orders (number of planes 3,000 lb. and over)	396	400	603		

Plane Shipments Increase 24%

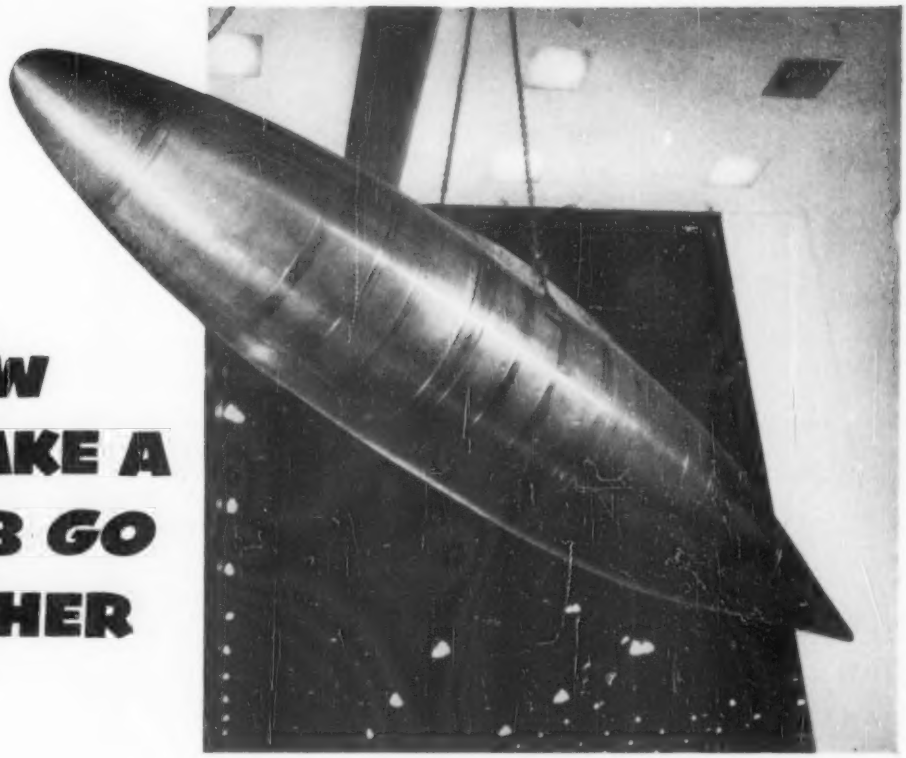
Aircraft industry shipped 402 complete civilian planes and 671 civil aircraft engines during April, according to monthly reports of the Census Bureau and Civil Aeronautics Administration.

Aircraft shipments valued at $15.3 million were up 24% over March. Engines increased 1%, adding up to a total value of $5.5 million.

Backlogs in aircraft decreased by four to 396 during April, compared with the previous month.

Complete aircraft shipments during the first four months of 1953 were valued at $61.8 million. In the same period of 1952, the value was $60.7 million.

Civil engine shipments during the first four months amounted to $15.6 million.



HOW TO MAKE A BOMB GO FARTHER

What you see pictured above is not a bomb—but a droppable fuel tank, one of many types built by Goodyear Aircraft Corporation to increase the effective striking range of bombers.

Attached under the plane's wings, these tanks are rigged so that they can be released in flight after the fuel has been used. Unimpeded, the bomber flies the rest of the way to its far-off target—and back—on the fuel provided by its regular, inboard supply.

These lightweight, all-metal tanks require no liner—are absolutely "fuel proof," pass exacting slosh and vibration tests. Precision engineered, some are designed so that they can be shipped "knocked down"—telescoped to one-third size for easy handling and storage—then assembled in a matter of minutes when needed.

Goodyear Aircraft produces all manner of fuel tanks and cells for both commercial and military aircraft—drawing on experience that goes back to 1920 when Goodyear engineers designed the first successful bullet-sealing tank in aviation history.

Such engineering and production is typical of the kind being done every day by the Goodyear Aircraft Corporation for practically every member of the aviation industry. Whether the job is one of building vital components, airframes or complete aircraft—Goodyear stands out as America's most versatile aircraft manufacturer. Goodyear Aircraft Corporation, Department 65, Akron 15, Ohio.

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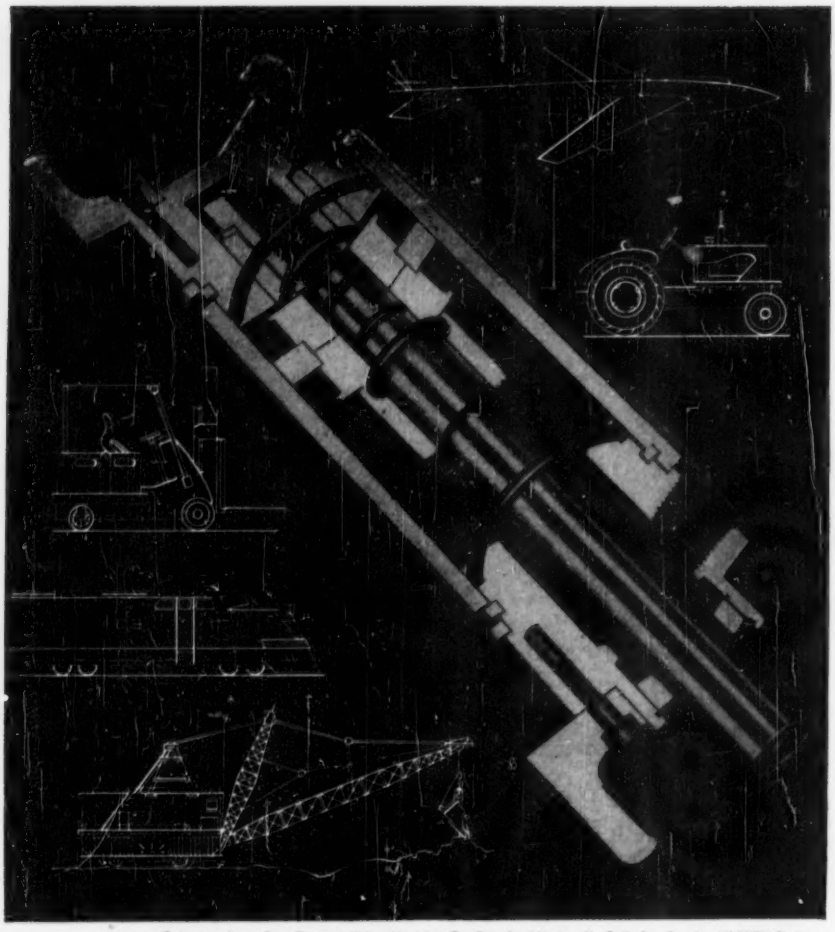

Cutaway view of an Ortman Miller Machine Co. Standard Hydraulic Cylinder showing PARKER O-rings.

Specify PARKER O-rings for economical, leakproof seals

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Cross section drawing of O-ring in groove, sealing under pressure.

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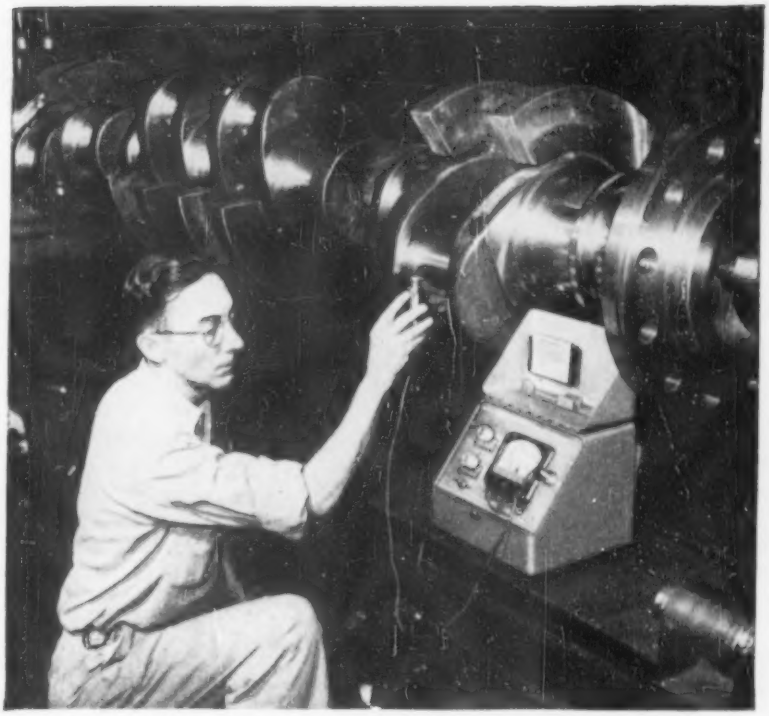
U.K. Aircraft Labor Force Increases 50%

The British aircraft industry's labor force has increased approximately 50% since June 1950. It totaled 212,400 in March, according to latest official figures from Great Britain.

The number joining the industry came to 2,400 during March, the average for the previous 18 months but slightly less than the 2,500-a-month average for the first quarter of 1953. The figures are for employes in the airframe, engine, landing gear and propeller manufacturing divisions and do not include parts and accessory firms or subcontractors.

HEIGHT OF FASHION

Here is a new "space suit" being ground-tested by Navy at its Aero Medical Laboratory, Philadelphia, prior to flight trials. The suit is made of black, pliable rubber. Fitted automatic devices insure the pilot getting sufficient oxygen when the plane's oxygen or pressure systems have failed or after he has bailed out. The large plexiglas helmet is zippered to the neck of the suit. The suit has been tested successfully in a pressure chamber (lower photo) to 70,000-ft. simulated altitudes.



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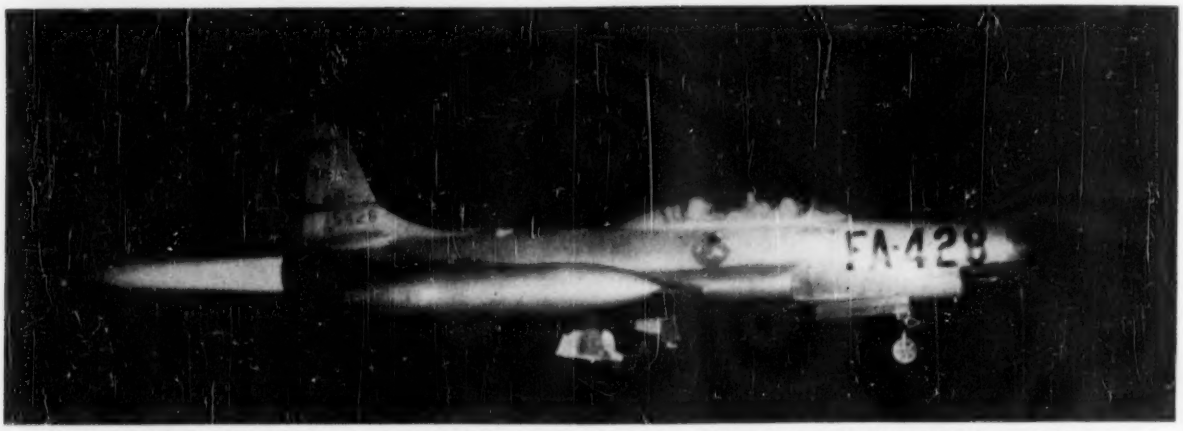

DECIBEL READINGS GO UP when jets add afterburners (like this one on a Fifth Air Force F-94) but Rolls-Royce finds . . .

Tailpipe 'Teeth' Cut Jet Engine Noise

Rolls-Royce reports metal tailpipe rim extensions reduce low-frequency sounds met at high speeds.

Some reduction in jet engine noise is promised as the result of tests conducted by Rolls-Royce, Ltd., on an engine modified by the addition of "teeth"—metal extensions placed around the rim of the tailpipe.

This simple device, says the British engine firm, will reduce markedly the low-frequency noise from a high-velocity jet at negligible cost in engine performance but at some increase in high-frequency noise.

F. B. Greatrex, who reported on the tests made by his firm to a recent acoustics symposium in London, adds they really don't understand why the gadgets reduce the noise level.

This was about the only note of optimism struck at the symposium, and the only positive solution offered for reduction of any one of the several kinds of noises fostered by the jet age.

▶ **The Problem**—At the heart of the problem is the jet engine. In itself a powerful noise source, the jet powerplant has increased airplane noises associated with airflow over and around the airframe because of the increased speeds possible.

The now-common sonic bang is only one of the many kinds of noises which are directly or indirectly chargeable to the jet engine. Some of the basic types considered at the symposium:

• **Subsonic aerodynamic noise from a jet.** This noise comes from turbulence in the shear layer—between jet and surrounding air—downstream of the jet exit. Near the exit, the turbulence is small, and the noise is high frequency; further down, the turbulence grows and the noise is low frequency. This kind of noise is roughly proportional to the eighth power of the jet speed.

• **Choked-condition noise from a jet.** This noise is in addition to that produced in the shear layer, and happens when the jet is choked, that is, when sonic speed has been reached somewhere in the jet. The geometry of the resultant downstream flow—which contains standing shock waves—can set up resonance. This kind of noise has been shown to increase in proportion as high as the 29th power of the jet velocity.

• **Noisy combustion in and after the burners.** This could be caused by flame instability, where burning takes place along a fluctuating front. According to the British, there has been little done to solve the problems of this noise.

• **Propeller noise.** This results from air displacement by the moving blades, forces exerted on the air by the blades, vortex motion in the wake and—at high speeds— the shock waves. The magnitude of acoustic power output can be as high as one-tenth of the mechanical energy input for near-sonic tip speeds; this is a very high conversion rate.

• **Boundary layer noise.** This kind of noise increases with an increase in drag. The noise level is high, judging from measurements made on gliders flying at low speeds, and there is a possibility that the noise may have a high ultrasonic content.

• **Sonic bangs.** These have been demonstrated frequently in public, and while the effects are known, the details of the causes are still being argued. Pressures along the wave front are assumed to be on the order of one pound per square foot. The symposium was told that even a ten-fold increase in this value would not result in any damage to well-built structures. But as a nuisance value, the sonic bang was not to be underestimated; a supersonic air transport flying overhead at 20,000 ft. would cause bangs corresponding to one psf. intensity at all points along its projected path on the ground.

▶ **The Solution**—In some cases, such as the sonic bangs, there is no solution, except control of the flight path to route the noise over less-populous areas. In other cases, such as the jet engine, there are some possibilities of noise reduction through basic design.

Greatrex, in reporting on the fundamental test approach which Rolls-Royce used, says that high jet velocity is the villain in producing noise, and the hero in producing additional thrust from afterburning.

For the Avon engine, the maximum possible noise due to the addition of afterburning would total something like 160 decibels at the point of maximum intensity, well above the level where noise becomes painful.

Greatrex points out that if thrust increases are obtained by afterburning, the noise produced is proportional to the ninth power of the thrust. If the same thrust increase is obtained by building a larger engine, then the noise is also increased in proportion to the thrust.

To overcome the noise, there is a possibility of designing the engine to use a lower jet velocity from the start. This in turn means an engine with lower operating temperatures, and such an engine, says Greatrex, is inevitably larger and heavier, although its fuel consumption is less.

"Fortunately, the large civil jet airliner, for which noise levels must be much less than for military aircraft, is just the right application for an engine of this type. Such an engine—the Conway—already exists and it is hoped that measurements shortly to be made will confirm the expected reduction in noise."

▶ **Added Gadgets**—Teeth attached to the rim of the jet nozzle have been found to reduce the noise levels. These teeth may be either parallel to the jet stream axis, or bent slightly inwards.

Most effective configuration so far tested uses six square teeth spaced evenly around the nozzle, three parallel to the jet axis and three bent in at a 30-deg. angle.

The noise reduction obtained with these teeth is substantial, and it costs a negligible amount in engine performance.

The teeth would appear to be effective only at high jet velocities, which suggests that they would not be of particular value on the Conway.

"Summing up, it appears that a simple device is available which will markedly reduce the low-frequency noise from a high-velocity (subsonic) jet, although the mechanism of this reduction is not really understood, at negligible cost in engine performance and at the expense of some increase in high-frequency noise." —DAA

SAE Starts Study on Vibration Protection

Improved packaging protection for delicate aircraft equipment to minimize effects of shock and vibration is getting close study by a group of industry engineers.

This group is functioning as a Society of Automotive Engineers' committee (S-8). Its work was begun because there was insufficient information available on physical characteristics of packaging materials, shock and vibration encountered in transit, and fagility ratings on equipment in general. Also, there was no method for correlating information such as this.

▶ **Subcommittees**—The SAE group has established five subcommittees to work on individual phases of the packaging problem:

• **Establish a suitable test** procedure for evaluating how fragile a particular piece of equipment is.

• **Classify instruments**, electronic gear

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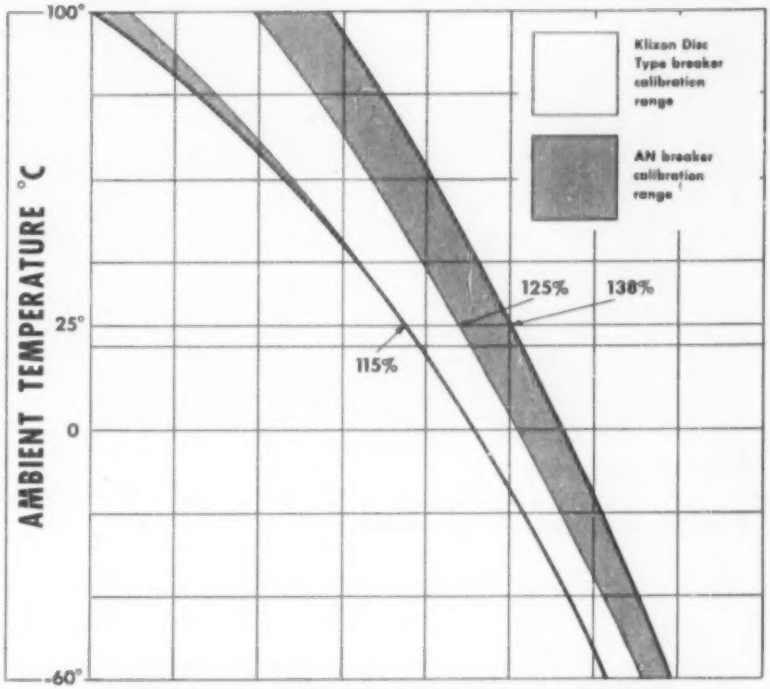
For Positive Circuit Protection



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and similar items into groups based on fragility.

- **Correlate physical characteristics** of packaging materials to make a complete tabulation available to engineers.
- **Investigate shock and vibration** encountered with various methods of transportation and in handling.
- **Consolidate this data** in a simple, easy-to-use report.

► **Data Asked**—Already, a tentative rating sheet on the fragility of equipment has been submitted to various manufacturers. The sheet calls for two basic forms of information:

- **Maximum deceleration** to which the equipment should be subjected.
- **Natural frequency** of equipment components below 75 cups. (It has been reported that a frequency greater than 75 cups. is usually damped out.)

The committee has had considerable discussion concerning the type of test equipment that should be used to establish a fragility rating. An attempt will be made to recommend a standard type testing device.

Committee S-8 members include J. H. Best (chairman), Bendix Radio Division; R. G. Ballard (vice chairman), General Electric Co.; Capt. J. E. Arnoult, Wright Air Development Center; K. B. Austin, Allied Control Co., Inc.; John Cammarata, Arma Corp.; C. E. Crede, Barry Corp.; W. L. Hardy, Foster D. Snell, Inc.; W. H. Skidmore, Weston Electric Instrument Corp.; H. J. Wenborn, General Electric Co.; and M. Zaid, Sperry Gyroscope Co.

Flight Bumps Eased For Lightplanes

A flight shock absorber has been developed for a Taylorcraft personal plane by Earl Metzler, Latrobe, Pa.

The shock strut is mounted between the wing strut and the fuselage attachment.

Metzler has been conducting flight tests for several months and says that these tests have proven the value of the device. The inventor claims that in addition to taking the bumps out of rough air, the shock strut can also be used to increase dihedral angle by relieving the internal hydraulic pressure. This, says Metzler, will increase lateral stability of the airplane to the extent that an amateur pilot can fly under blind conditions.

Porous Stainless Steel For F-102 De-Icing

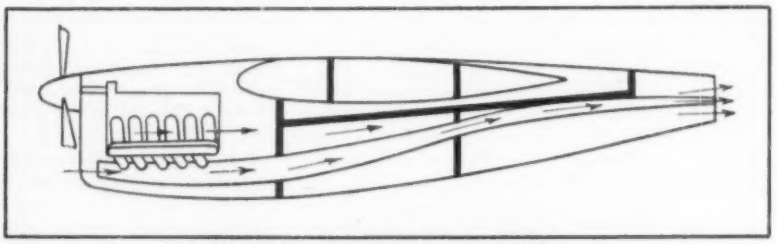
Consolidated Vultee Aircraft Corp.'s F-102 highspeed, delta-wing interceptor is scheduled to be fitted with porous stainless steel leading edges on wing and tail, in what is reported to be the first application of this material for icing control on airfoils.

► **Flow Data**—The material is a Type 316 sheet developed by Aircraft Porous Media, Inc., Glen Cove, N. Y. Sheet thickness of the wing material will be .040 in.; on the tail leading edge it will be .030 in. The .040 porous skin will allow a flow of 40 cfm./sq. ft. at a pressure drop of 2 psi. or 20 cfm./sq. ft. with a drop of 1 psi.

The report is that the porous leading edge system will need only about half the heat required by its conductive-heat system counterpart. The material has been windtunnel-tested at Convair under icing conditions.

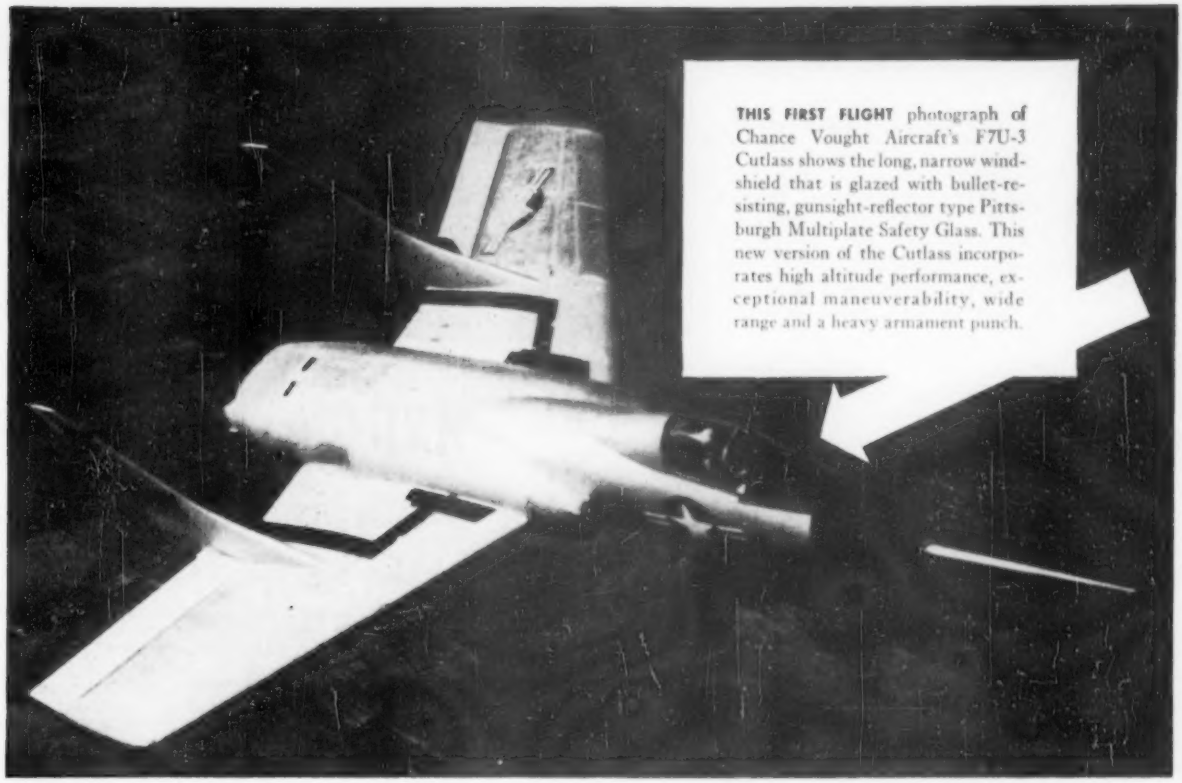
It is said that the installation can be used for anti-icing as well as de-icing—with the heated air being directed through the sheet in anticipation of icing conditions.

► **Other Uses**—The porous material is being considered for possible applica-



JET AUGMENTATION PATENT

Nacelle exhaust-cooling arrangement patented recently by Fairchild Engine and Airplane Corp.'s president, Richard S. Boutelle, is claimed to increase jet thrust of exhaust, provide improved flame damping and better silencing. Engine exhaust is dumped into a duct having a gradually diminishing cross-section. Ram air is admitted to this duct through a spring-loaded check valve. Valve stays closed when aircraft is maneuvering on ground at low speeds, but as plane accelerates, air pressure overcomes spring resistance. Ram air causes "a secondary or more complete combustion of the unburned fuel in the exhaust to thereby increase the exhaust gas pressures at the outlet of the exhaust duct," the patent says. Jet thrust of this exhaust is increased by engine cooling air flowing out of the nacelle through the annular space surrounding the engine exhaust duct. Flow is controlled by valve operated by pilot.



THIS FIRST FLIGHT photograph of Chance Vought Aircraft's F7U-3 Cutlass shows the long, narrow windshield that is glazed with bullet-resisting, gunsight-reflector type Pittsburgh Multiplate Safety Glass. This new version of the Cutlass incorporates high altitude performance, exceptional maneuverability, wide range and a heavy armament punch.

Latest version of Navy's tailless Cutlass equipped with bullet-resisting windshield of PITTSBURGH MULTIPLATE SAFETY GLASS

DESIGNED to out-fly or out-fight any other carrier-based fighter in the world, Chance Vought Aircraft's new F7U-3 Cutlass is a bigger, better-equipped, harder-hitting version of the original F7U-1, the first sweptback-wing, tailless fighter to operate from a carrier.

And like almost all of America's first-line military and commercial aircraft, the new Cutlass provides clear, undistorted vision under today's extreme flight conditions with Safety Glass by Pittsburgh.

The exceptionally long, narrow windshield of the Cutlass is glazed with Pittsburgh Multiplate—a bullet-resisting, gunsight-reflector type of safety glass that is reground and repolished to provide maximum optical properties.

There's good reason why so many aircraft manufacturers bring their glass and glazing problems to Pittsburgh Plate Glass Company. Designers know that Pittsburgh offers them the widest selection of special-purpose, aircraft-type glass and glass-and-plastic laminations, together with competent engineering help and knowledge of the latest glazing techniques.

If you are concerned with aircraft glass and glazing problems, we invite your inquiry. Pittsburgh Plate Glass Company, Room 3296, 632 Fort Duquesne Blvd., Pittsburgh 22, Pa.

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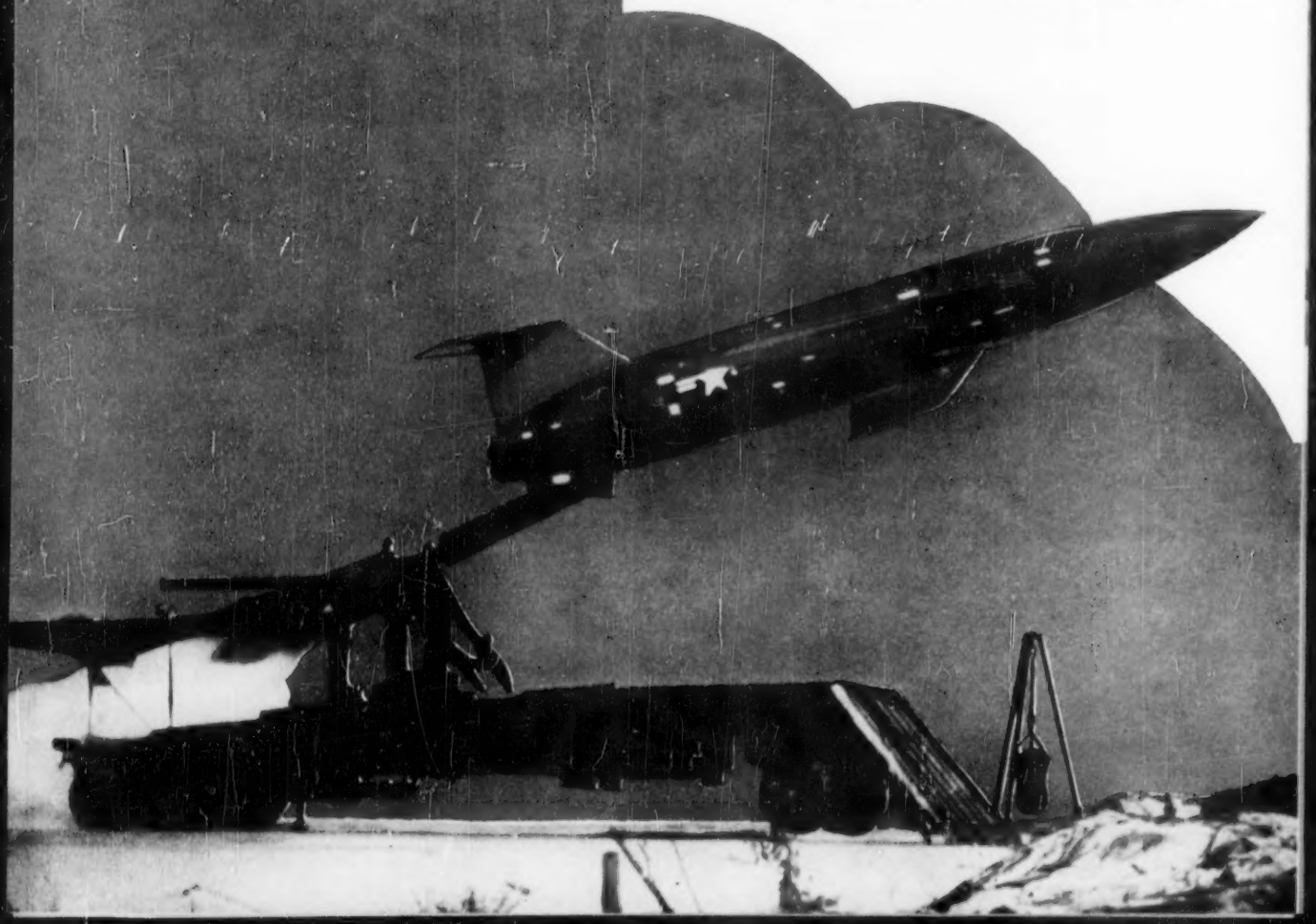
The Mission of the Air Research and Development Command is to make certain that the United States Air Force is now, and will continue to be, equipped with the *best planes, fuels, weapons,* and *techniques,* that modern science can devise. How this Command is serving the nation will be reported by AVIATION WEEK, August 17, 1953. There is no more important subject today for Government, Industry or Mili-



THE AIR FORCE'S DEVELOPMENT COMMAND, REPORT "AVIONICS IN THE AIR FORCE."

answer to present and future air power progress

tary than the story of ARDC. In this Command rests the responsibility for present and future Air Power progress.

Along with the ARDC issue will be a special report titled "Avionics in the Air Force". This rapidly increasing, great, new Aviation market is indissolubly bound into Air Force Research and Development. Current problems and new techniques in communications, navigation, and fire control for high speed bombers, interceptors, and missiles will make for articles of absorbing interest to AVIATION WEEK subscribers. Within the limits of national security, this full fledged, detailed report will unfold the picture of our progress and needs for future years.

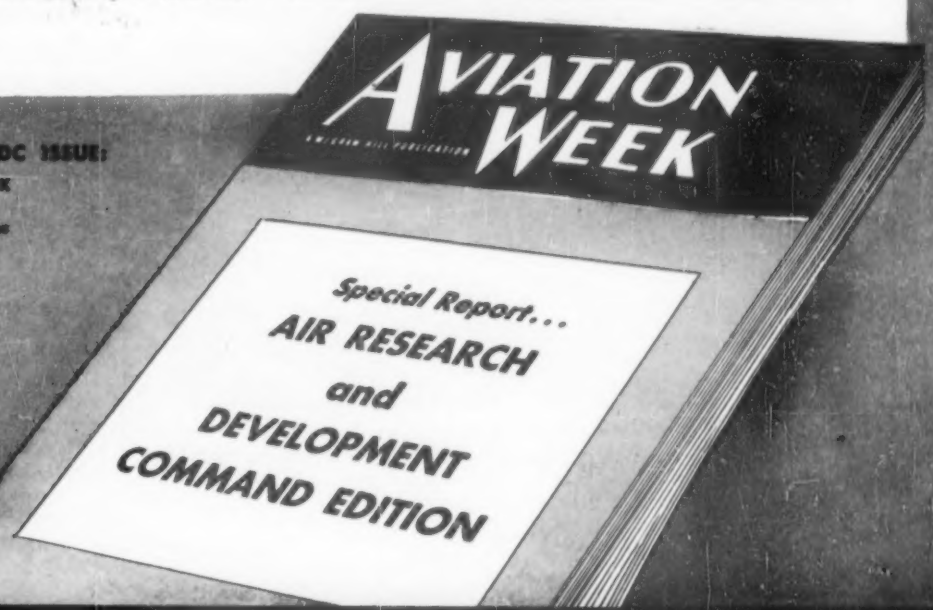
The ARDC issue will entail the most extensive traveling program for AVIATION WEEK editors in our history. Special flights have already been made to the 9 Major Centers, where briefings and staff meetings were held by the Command for the AVIATION WEEK Editorial Group. Followup trips are now being made by AVIATION WEEK editors on special assignment, revisiting each Center.

For the information of advertisers, there will be no advance in advertising rates. You are urged to contact the Sales Manager, AVIATION WEEK, 330 West 42nd Street, New York 36, New York or write ARDC Issue Headquarters, Lord Baltimore Hotel, Baltimore, Maryland.

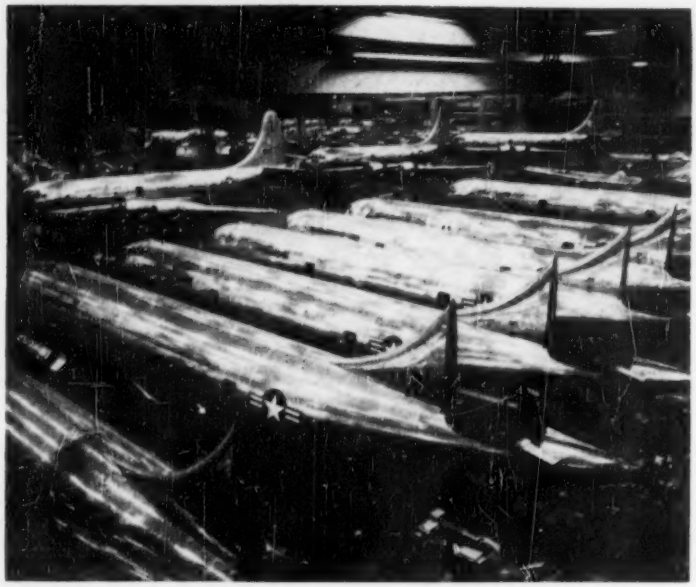
Look for the August 17th, AVIATION WEEK issue for its extra editorial bonus

FACTS ABOUT THE ARDC ISSUE:

1. Like the 1952 AVIATION WEEK Air Materiel Command edition, there will be special de luxe copies available for Air Force use.
2. Due to our experience with the AMC issue — a sellout shortly after issuance, several thousand extra copies will be ordered and earmarked for Service use.
3. Advertising reservations should be made without delay. Last year's AMC edition was the largest yet published in our industry. Interest in the ARDC issue at this time indicates an equal, if not larger issue.



Aviation Week Picture Brief



FUSELAGES are lined up, ready to be fed into horseshoe-shape final line. Aft fuselage takes refueling pod or cargo doors.

Stratofreighter Horseshoe

A horseshoe-type assembly line at Boeing Airplane Co.'s Renton, Wash., plant is helping promote production economies in construction of KC-97F Stratofreighters. Replacing parallel lines previously used, the horseshoe arrangement doubles back on itself, permitting final assembly of the huge double-decker hauler without moving personnel from place to place.

Feeding of parts to the horseshoe line is coordinated by Boeing engineers for the production teams involved. Boeing builds many of the components for the planes, while others are fed in from subcontractors such as Ryan Aeronautical Co., which builds the aft fuselage sections, and Rohr Aircraft Corp., which furnishes the complete power packs for the plane.

WINGS are given the finishing touches in this line before the panels are moved to the horseshoe swing for hookup to the fuselage.

tion in the nose portion of jet engine air intakes, to prevent ice formation. Aircraft Porous Media also is reported to be working on a boundary layer control stainless sheet that will have uniformly varying porosity in both the spanwise and chordwise directions.

Another application being checked is porous stainless sheet for transpiration cooling to reduce high skin temperatures.

► **Properties**—The 316 porous stainless sheet with 35-40% voids is reported to have these properties (those for solid stainless are noted in parentheses in the listing):

- **Ultimate tensile strength,** 35,000-55,000 psi. (92,000-105,000).
- **Modulus of elasticity,** approximately 15,000,000 (30,000,000).
- **Elongation,** test coupon, 3-8% (55-60%); calculated from minimum bend radius, 8-12% (55-60%); calculated from hydrostatic test, 10-14% (55-60%).
- **Thickness control,** ±0.02 in.
- **Surface characteristics.** Smoothness to eye and feel better than No. 2B stainless steel sheet finish.
- **Formability.** Can be formed to a radius equal to three times the material thickness; mild drawing possible; more severe deformation possible with intermediate furnace treatments, with consequent increase in strength of formed parts.

New Oscillograph for Test Instrumentation

New 16-lb. oscillograph provides 14 individual data channels and operates from 24-28-v. d.c., making it suitable for flight test instrumentation. Developed by Midwestern Geophysical Laboratory, the new Model 580 uses 3⅛-in.-wide industrial recording paper. It can hold 100 ft. of the paper in its magazine.

Recording speeds of 1, 3, 6½, 13, and 32 in./sec. are available by gear changes and higher speeds can be obtained if desired. Full-width viewing screen displays galvanometer traces while unit is operating. The device provides timing lines at 0.01 or 0.1 sec., as desired.

Midwestern Geophysical Laboratory, 3401 South Harvard, Tulsa.

Missile Shock Mount

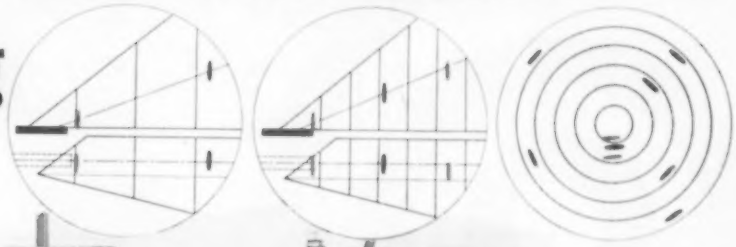
A special shock mount designed to cope with severe vibration and acceleration characteristics of guided missiles has been announced by Robinson Aviation, Inc.

The unit can be used to protect equipment such as electronic guidance systems in missiles, the company says. It is designed for isolation vibration and shock for positive, negative and radial

New Gilfillan Radar Trainer Means...

Better Training

Big Savings



Blips shown in red are put on scopes by Gilfillan Trainer. Blips shown in black are real aircraft. On actual scopes, both look alike. Trainee cannot distinguish between real and simulated aircraft.

QUICK FACTS

The new Gilfillan Radar Trainer is practical, compact, subminiaturized. Occupies 5 square feet. Costs less than $15,000.

Creates "real" aircraft on all radar scopes. Local terrain, obstacles and real aircraft are retained on the scopes. Realistic.

Easy to operate: by an instructor; by trainees; by radar team to maintain peak efficiency.

BETTER TRAINING

Affords constant on-the-job training of radar operators on operating radar in the field, regardless of weather or lack of traffic at radar site.

Broadens operator experience. An unlimited variety of maneuvers can be practiced, including extreme emergency conditions impossible with real aircraft such as collision courses, dangerously low altitude approaches.

Increases operator assurance, seasons judgment. The operator's reaction to a real emergency is quicker, his judgment better, because he has practiced many similar situations enacted by the Gilfillan Radar Trainer.

BIG SAVINGS

At present, actual aircraft must be flown to provide practice problems for the radar team. At $200 per hour operating cost of an aircraft and crew, an 8-hour period with 2 planes costs $3200. The Gilfillan Radar Trainer pays for itself in one 36-hour period — *and* provides a far wider variety of problems.

Heretofore, problems involving "invading enemy aircraft" have been unrealistic because the "test atmosphere" has prevailed. Now surprise attacks can be simulated instantly and *realistically*. Practice can be constant and varied. And savings are tremendous.

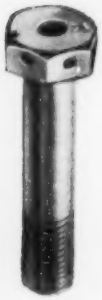
In GCA and Radar Research, Design and Production,

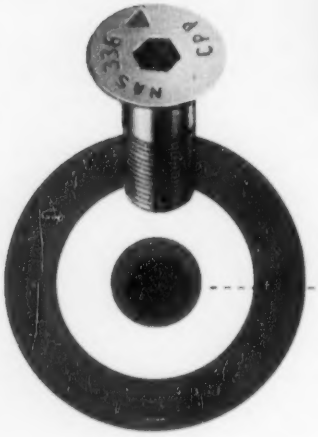
the FIRST name is... *Gilfillan*

Los Angeles

GCA

The Gilfillan Radar Trainer is a development of the Gilfillan Research Group. For more complete details, write Gilfillan, 1815 Venice Blvd., Los Angeles 6, California.





Daily production of fasteners for advanced and critical applications charts a pattern of high precision for the runs of AN and NAS standards which form more than half of Cooper's business, and receive a major share of Cooper's attention.

COOPER

precision products

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loads, using an all-metal cushioning material, Met-L-Flex.

Features of the device cited by Robinson: non-linear deflection, high damping, low amplification at resonance, and capacity to withstand a wide range of temperature and environmental conditions. The mount is available in load ranges from 1-7 lb.

Robinson Aviation, Inc., Teterboro, N. J.

Jet Control Computes Discharge Pressures

A new control that directly senses jet engine turbine-discharge pressures has been developed at Solar Aircraft Co. The device is designed to replace complicated electronic equipment.

Solar's president and general manager, Edmund T. Price, reports that Westinghouse Electric Corp. has ordered several hundred of the units for use on J46 engines at a cost exceeding $200,000. Smaller orders have been received from other companies for testing and experimental purposes.

Known as the Solar Microjet, the new control is a lightweight, rugged unit.

It is said to be easily installed, requires a minimum of maintenance. In action, it computes by itself under all flight conditions just what the turbine discharge pressure should be and, at the same time, notes any error between this value and actual engine pressure. The Microjet electrically signals any error to other engine controls, which correct the pressure conditions.

Solar reports the instrument is highly accurate, recognizes pressure variations in 1/100 sec.

The device was invented by Wendell Reed, Solar project engineer.

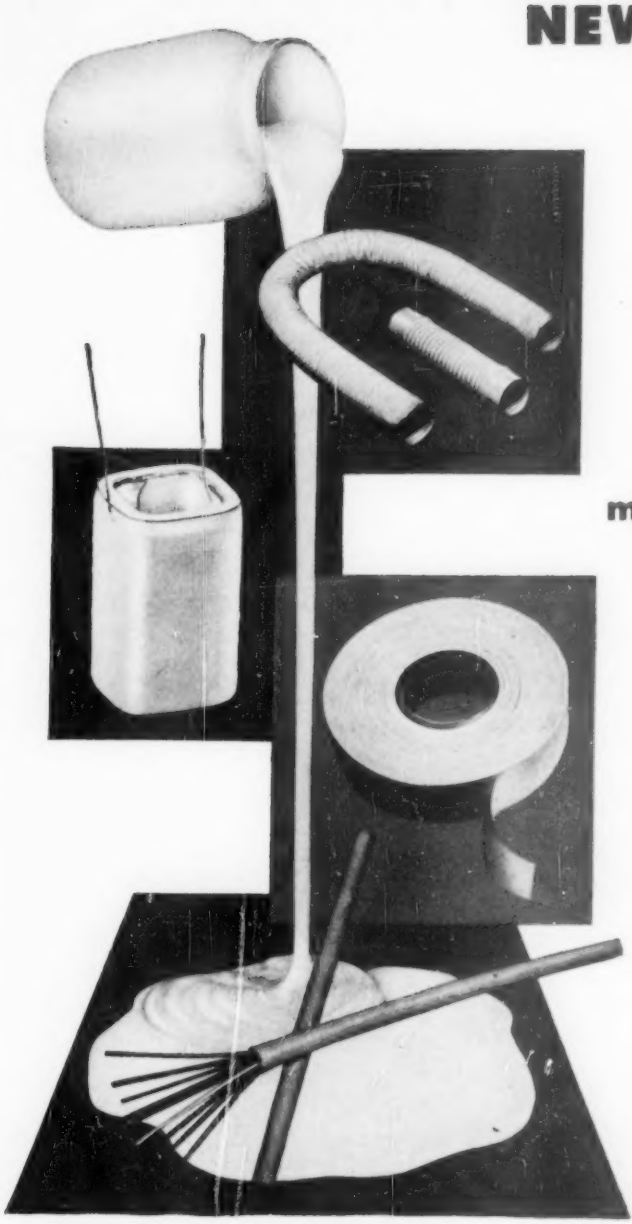
Correction

On-the-spot inspection and statistical quality control at Hughes Aircraft Co. have cut overall machine shop spoilage on precision radar and fire control components to around 3%, dollarwise, and not 30% as a printer's error made it appear in last week's AVIATION WEEK (p. 45).

NEW

SILICONE RUBBER COMPOUND

for electrical and mechanical applications



SE-100 COMBINES

- Outstanding heat resistance
- Outstanding electrical properties
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- Ease of application

You can now extend equipment life and minimize insulation failures by specifying General Electric's new silicone rubber compound, SE-100.

SE-100 may be coated on glass or organic fabrics for service at high or low temperatures or where resistance to weather, ozone, corona or chemicals is required. In addition, SE-100 is available as a dispersion (SE-100S) and may be used to encapsulate coils and components for electrical insulating purposes.

SUGGESTED USES

Electrical: Cloth, tape and sleeving; coating for glass-served wire; encapsulating coatings.

Mechanical: Ducts and tubing; gaskets and seals; diaphragms.

HERE'S PROOF!

Typical properties of glass cloth coated with SE-100:

Dielectric strength, volts/mil	1200-1400
Power factor, 60 cycles	
85 F	0.0110
212 F	0.0072
Tensile strength, lbs./in. width	150
% Moisture absorption, 96 hrs.	0.11
Serviceable from	−76 to 480 F

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Please send me product data on SE-100, list of fabricators, and a free copy of *G-E Silicones for Industry*.

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(In Canada, mail to Canadian General Electric Company, Ltd., Toronto.)

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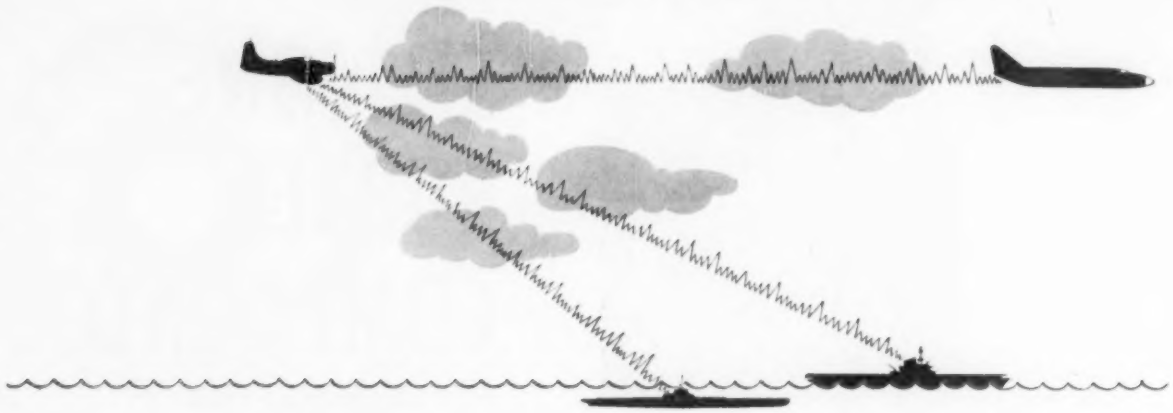
stalks enemy planes, subs and surface craft



—the Douglas AD-5 Skyraider

Known for varied tactical uses—long-range attack, troop transport, close air support, aircraft early warning—the Douglas AD-5 is also capable of unique search and anti-submarine missions.

In this operation the AD-5 carries powerful radar equipment and a search-light to detect and identify the enemy, whether on the surface, under the sea or in the air. Rockets, cannon, and torpedoes are used to make the kill. Key feature of the Skyraider is its efficient performance-to-weight ratio, which gives it extraordinarily long range—plus all the fire-power of a cruiser's full salvo.

Adaptability of the AD-5 Skyraider is another example of Douglas leadership in aviation. Designing airplanes that can be produced in quantity to fly *faster and farther with a bigger payload* is a basic rule of Douglas design.

Be a Naval flier—write to:
Nav Cad, Washington 25, D. C.

Depend on *DOUGLAS* First in Aviation

Big Job for Production Engineers:

Getting New Materials Ready for Use

- **Producibility may equal weight, strength benefits.**
- **Designers must collect mass of proving data.**

The aircraft industry is a ready field for new materials because the steady rise in airframe, engine and equipment performance brings with it the need for progressively greater strength and lighter weight.

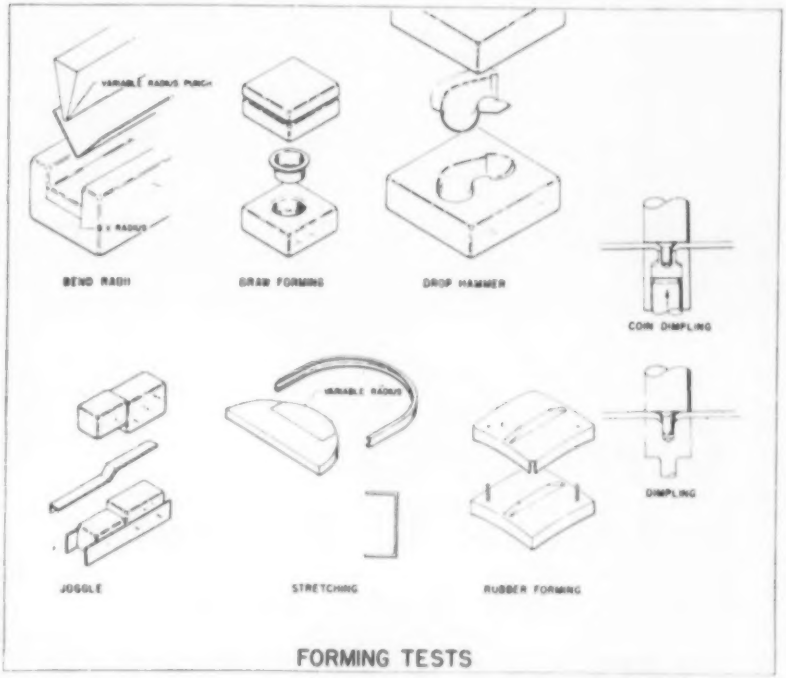
However, materials that meet the basic demands do not necessarily fill the bill—at least not until a host of other conditions are met. One of the most important is producibility.

With the exacting requirements imposed today in the tight-schedule, smooth-flow, precision-work production sequence, great significance attaches to how easily a material can be machined, formed, welded, forged, and cast. Designers are becoming acutely conscious that getting the article built with reasonable production effort must get top emphasis.

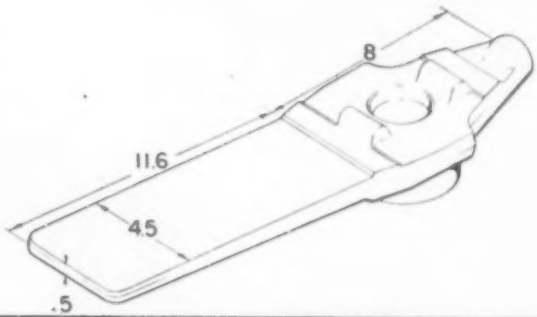
▶ **Basic Job**—Development of producibility data is no easy job—it is a painstaking, close-look operation. This productionizing procedure for new materials was clearly analyzed by Lockheed Aircraft Corp.'s group engineer, Howard W. Benjamin, last week before the semi-annual meeting of American Society of Mechanical Engineers, in Los Angeles. Benjamin deals with the metallic materials category, but points out that non-metallic materials must also get their share of close scrutiny.

His productionizing analysis breaks down the factors involved into fundamental categories—basic tests, cost and methods considerations, pilot-line details and data transmittal. He does not feel that the testing he outlines will afford the complete data required for production, but it should give the basic information necessary to make a preliminary comparison of a new metallic material with other familiar materials.

▶ **Cooperative Program**—A recent survey of proposed cooperative programs has indicated that several airframe manufacturers are interested in standardizing fabrication tests for new materials, Benjamin reports. If these companies agree on a standard basic test program to be performed on a cooperative basis,



STANDARD FORMING TESTS yield data comparing new materials with old.



TIP TANK SUPPORT			
DESCRIPTION	8630 STEEL (ACTUAL)	NEW MATERIAL PRODUCERS DATA	NEW MATERIAL DATA FROM BASIC TESTS
COST OF FORGING STOCK	$ 0.10/LB.	$ 10.00/LB.	$ 13.00/LB.
MAT'L COST/ FORGING	$ 6.00	$ 195.00	$ 254.00
FORGING COST/ PART	$ 1.90	$ 5.70	$ 10.00
TOTAL COST OF FORGING	$ 7.90	$ 200.70	$ 264.00
MACHINING COST / PART	$ 130.00	$ 390.00	$ 500.00
TOTAL COST OF FINISHED PART	$ 137.90	$ 590.70	$ 764.00
WEIGHT SAVED PER PART		5.9 LBS.	5.9 LBS
COST PER LB. OF WT. SAVED		$ 100.12	$ 129.50

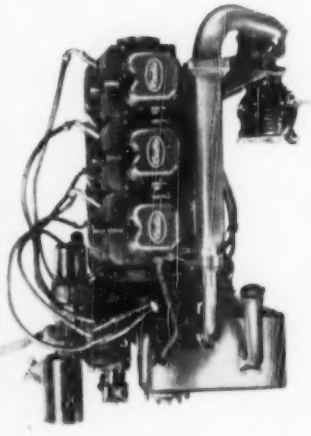
HIGH COST OF WEIGHT REDUCTION is shown in forging cost analysis.

Over 1,000
Bell Model 47 Helicopters have now been made— every one with

Franklin
POWER

More than 1000 Bell Model 47 helicopters have flown more than 500,000 hours—with Franklin engines exclusively providing the power. Production of these highly successful Franklin powered helicopters continues at an accelerated pace, with 67 delivered to customers in one recent month. More Bell helicopters are flying today than any other make.

Franklin engines are also the exclusive power source for Sikorsky S-52, Hiller 360 and McCulloch MC-4 helicopters. Without question, *the great majority of all helicopters flying today have Franklin engines.*



AIRCOOLED MOTORS, INC. SYRACUSE, N. Y.

the expense shared by each would be a small percentage of the individual cost of financing a complete program.

Although there are considerable variations in production equipment in each plant, the basic data obtained from the proposed standard tests are required, regardless of the fabrication method to be used in production.

A group of specialists—metallurgists, chemists and technicians—is necessary in each aircraft manufacturing organization, Benjamin contends. It should be the responsibility of this group to develop and prove the practical application of the material for use in the final product. Through authoritative data to designers and manufacturing, based on conclusive developments, the majority of guesswork could thus be removed in productionizing a new material.

► **Tests Required**—In Benjamin's outline of the productionizing procedure, a spot check is first made of producer data concerning physical, chemical and temperature properties to satisfy basic design needs. Additional testing must be continued to develop complete design criteria.

Benjamin holds that tests on several mill runs and shapes are required to obtain the variation in physical properties resulting from different reductions of the material and from mill practices in producing shapes.

Some of this information is available from the producer. But it is usually based on experimental runs and does not represent the statistical data obtained by testing several production mill runs, he says. This type of testing continues until a government material specification is available.

The effect of fabrication operation on the material is tested for structural data.

► **Machining Tests**—Samples of a new material are put through conventional machining operations, including cutting (such as slab milling, straddle milling, end milling, slotting, turning, boring and threading); drilling; reaming; capping; and grinding. In each of these operations, data are obtained for comparison with standard materials.

Costs can be analyzed by comparative floor-to-floor time on any of the machine operations. Tool life compared with other materials becomes a part of machining costs, Benjamin claims.

If conventional tools will not cut a new material, special tools must be investigated and costs noted for each operation in which they are required. Machining effects on material are checked by evaluating the percentage of rejections stemming from such causes as warpage, surface cracks and other defects that will cause scrappage of the part. Requirements for additional surface treatments or straightening are also determined.

Machining on present production

High altitude dependability assured with Westinghouse A-C Generators

Even at altitudes up to 50,000 feet, Westinghouse A-C Generators provide rated performance. Time-proved, high-altitude brushes are available to meet application requirements of any aircraft from sea level to 50,000 feet or higher.

These generators contain a built-in exciter, precluding the need for external electrical power. Special internally connected windings in the exciter field—a Westinghouse exclusive—prevent polarity reversal during generator build-up, load switching, or application and removal of short circuits. For easy maintenance, the brushes for both the commutator and slip rings are readily accessible—can be reached by simply removing one cover band.

Another Westinghouse innovation—the button-hole-type mounting flange—provides for ease of installation and the removal of the generators. All hardware used on the unit is standard—no need for special wrenches.

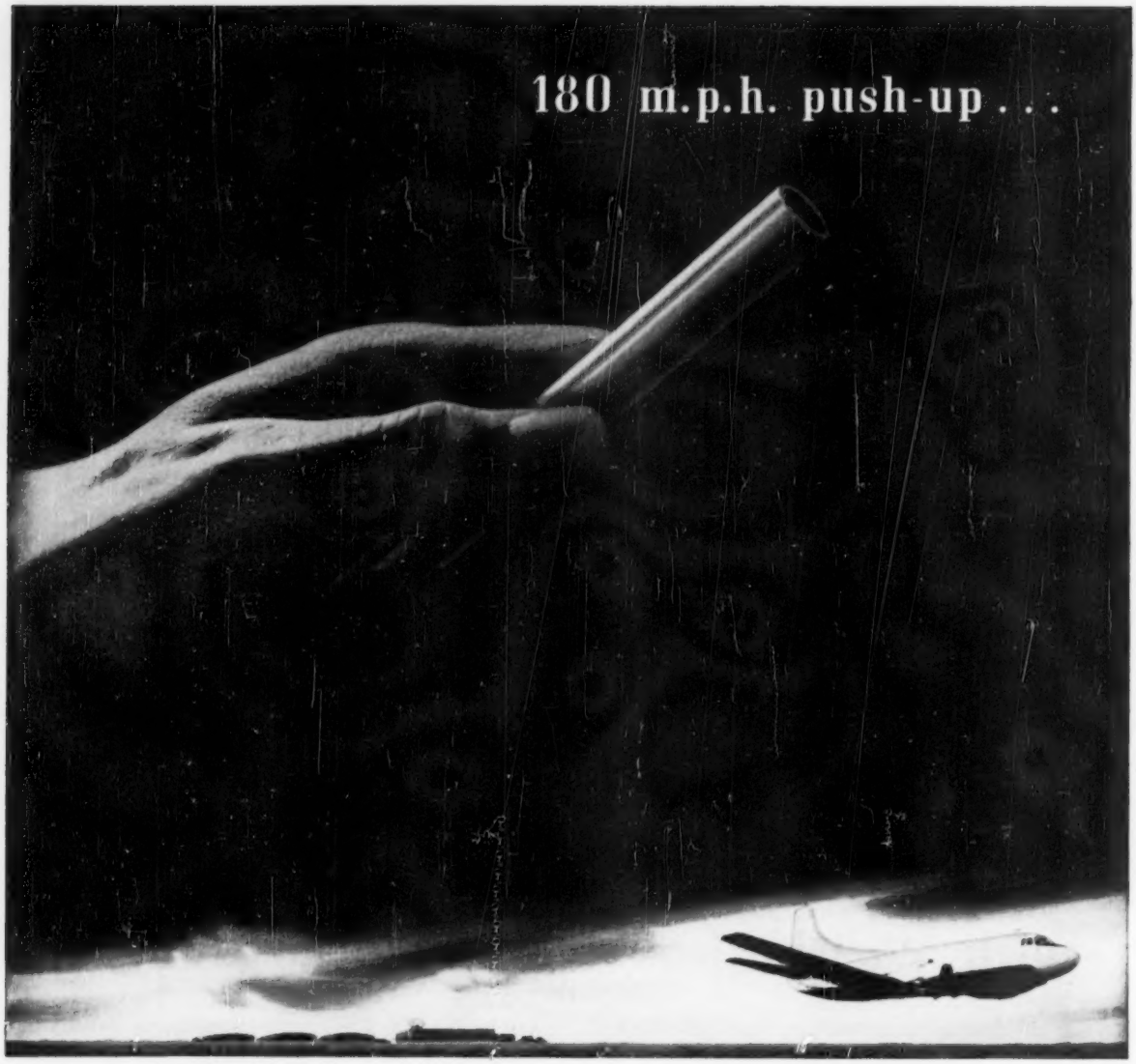
Although designed to conform to Specification MIL-G-6099, special applications, such as suction cooling, can be negotiated.

For information on these and other Westinghouse aviation products, call your nearest Westinghouse Representative today, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

J-03010

YOU CAN BE SURE...IF IT'S

Westinghouse



Any time you fly in a Martin 4-0-4, Superior tubing is probably working for your safety.

Once you're airborne, watch the 840-pound main landing gear assemblies flip forward and up with amazing speed, even though they may be working against a 180 m.p.h. drag. Fast landing gear retraction gives you an extra margin of take-off safety because "clean" aircraft have better flight characteristics.

Chances are your Martin 4-0-4 contains many feet of Superior ½" stainless steel tubing. In the hydraulic system, this tubing operates at a pressure of 3000 p.s.i., normally. On Martin's torture racks, it has demonstrated remarkable endurance under violent pressure surges at 1000 cycles *per second*, even around minimum bends.

Performance like this may well have a bearing on your production problems as well as on your personal safety. Superior's long experience in fine tubing, backed by highly-developed production equipment and extensive research and testing facilities assures you of top-quality small tubing for doing tough jobs well. Outline your own production problems in a letter to us, right now—we'll send you complete information and the appropriate Data Memo by return mail. Address: Superior Tube Company, 2040 Germantown Ave., Norristown, Pennsylvania.

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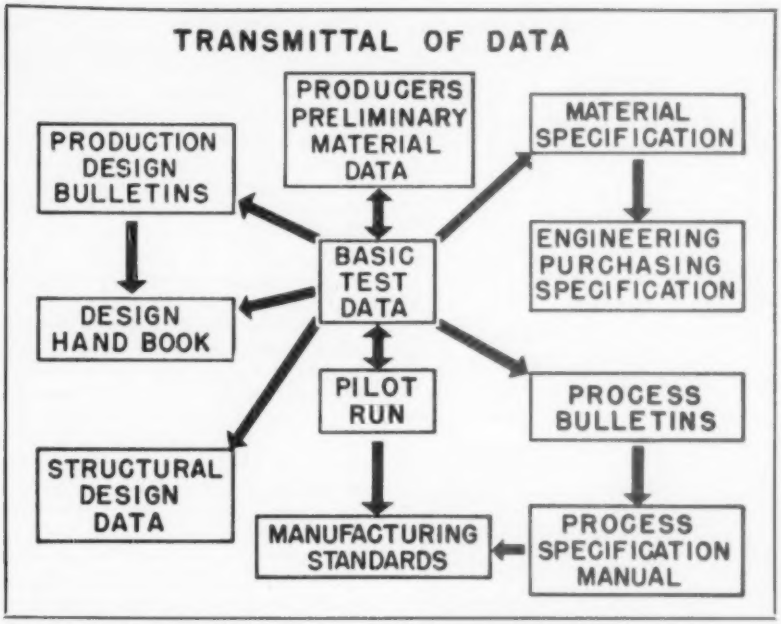


FLOW OF DATA through the fabricator's plant facilitates use of new materials.

equipment is another consideration, because some of the new materials being evaluated will require heavier equipment (or in some cases higher cutting speeds) to produce satisfactory surfaces and economical machining, Benjamin claims.

▶ **Forming Tests**—Various standard forming tests are used to give comparative data illustration on p. 39.

Bending on a standard brake tool with varying radiuses gives data on minimum bend radiuses. Width of the lower die is eight times the punch radius.

Joggling of angle sections of varying depths and transition lengths, both hot and cold, produces comparative joggle data with other materials tested.

Drawing is done with a standard cupping die. All samples are gridded for measurement of the variations in elongation after drawing. Maximum draw depth is obtained for a depth-to-diameter ratio.

Stretching over a standard die with inserts of varying radiuses produces data for elongation with grain and cross grain. Samples are gridded for measuring the areas of elongation and are prepared with both sheared and polished edges to show tendencies toward cracking. A 1% prestretch is given each sample to insure uniform properties before testing.

Drophammer operations evaluate complex forming characteristics. Parts can be formed at elevated temperatures, if necessary, to obtain best results. Here again, a grid is used—to measure shrink and stretch areas.

Rubber forming on a standard die with a 1-in. flange checks adaptability of material to withstand a 10% stretch and 8% shrink. Variations in flange widths allow testing of stretch and shrink values for 0 to 20%. Records of high-temperature and high-pressure forming are maintained.

Dimpled shapes and quality are checked with conventional and coin dimpling, both hot and cold. Pressure, dwell time and temperature are compared with other similar materials data.

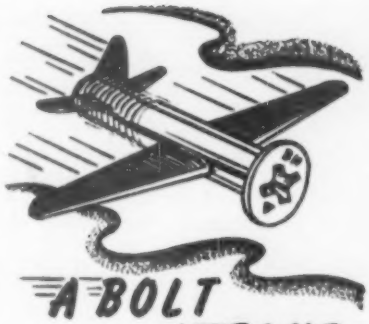
▶ **Welding Checks**—Spotwelding integrity is checked by using single-spot shear and tension tests, Benjamin says. These tests are also used to establish maximum pileup of material and compatability of similar alloys.

Consistency tests on 50 to 100 welds are normally run in panel form, Benjamin points out. Metallurgical examination is done by cross-sectioning the center of the spotweld and observing for geometry and faulty structure.

Flashwelding specimens are prepared from tubing, bar or plate stock. Tension and bend tests are used to check physical properties. Varying material thicknesses and diameters are checked for limitations in welding and design data. Metallurgical examination of grain structure, flow and defects are necessary to evaluate the method fully, Benjamin says.

Fusion welding is checked by producing panel-type specimens, using a particular welding method. The weld and affected area must be thoroughly analyzed with pull and bend tests, as well as metallurgical examinations.

▶ **Forging Examination**—Evaluation of metal movement will show the need for variations from standard forging techniques. The number of stages re-



A BOLT in the BLUE (sky that is)

N. A. S.-334-P Close Tolerance
Another BRILES FIRST!

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Naturally, we have checked this screw thoroughly with comparator charts and protrusion gauges to assure you of close tolerance and uniformity. The strength test shows the item withstands 160,000 to 180,000 P.S.I.

We are now running this item at High Production, with many dash numbers in overrun for fast delivery.

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COLD HEADED BOLTS
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quired to forge a part is an economic consideration.

Metallurgical examination of cross-sections will show up cold shuts, tearing, laps and other imperfections.

▶**Castings Considerations**—For new casting material, considerable coordination is required between user, foundry, and producer to develop casting specifications regarding strength of the material and its limitations for section thicknesses, flow and other data required for design.

Enough laboratory tests must be run to prove the material's adaptability to standard processing operations such as heat treatment, cleaning, descaling, surface finish and metallic and non-metallic coating. If standard processing operations are not suitable, additional studies are necessary.

Inspection techniques are investigated to maintain quality control standards. Methods such as X-ray, Magnaflux, Zyglo, Dy-check, etc., are examined and, if applicable, inspection standards are established. If available techniques are not sufficient to maintain quality control, new equipment and techniques must be developed, Benjamin points out.

▶**Cost of Weight Reduction**—Benjamin refers to a material recently introduced to the industry as an example of the cost of reducing structural weight.

The illustration on p. 39 shows an analysis of a forged part, comparing the new material to steel, which it could replace at a substantial weight reduction. The difference shown in the preliminary machining costs given by the producer and the actual machining costs proven during the standard tests highlights one cost that cannot be reduced without developing a new method for removing metal or developing a new alloy that can be more easily machined, Benjamin points out.

Each new material requires extensive methods-development work, not only to machine, forge, cast, form or extrude, but also to adapt present equipment or design new equipment to do these operations.

▶**Pilot Line**—When basic tests and cost considerations are completed, for the best comparative analysis on pilot line operation, it is desirable to select a part from production of a similar material on which all operations have been checked for labor and material costs.

The new material for the part can be put through the same operations or other operations required to produce the end product and the labor and material costs compared.

Benjamin claims that cost on the pilot line is of lesser significance than the way the material responds to the fabrication methods of the basic tests—laboratory operations vary from production operations, and these differences are corrected on the production pilot run.

By placing the parts on an airframe a complete check can be made of any assembly or installation problem. Service inspection by the plane operator will furnish the final data necessary to complete the design criteria and fabricating limitations of the new material.

▶**Data Transmittal**—It is of prime importance, Benjamin insists, that a smooth flow of information (as it becomes available during the testing for basic data) be transmitted to the design engineers, structural engineers and to the manufacturing organizations.

The data flow scheme (illustration on p. 43) has proved to be an orderly method of covering preliminary experimental data and production information, Benjamin says. These data are covered in the scheme:

• **Production design bulletin**. Through this medium, preliminary data are transmitted to furnish information necessary for experimental designs and to acquaint the designers with the proposed use of the material and its limitations as established by the fabrication tests. Bulletins are re-issued as more information becomes available.

These data are the forerunner of the complete design limitations to be published in the design handbook when the

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material has been completely analyzed for production.

• **Design handbook.** This book is a compilation of design limitations of all manufacturing methods within the organization. It becomes the designers' bible, since it is a quick reference for designing within the limitations of production equipment. When information on the new material becomes sufficiently standardized for general design use, it is published in this handbook.

• **Structural design data.** When the material is not sufficiently stabilized for the producer to publish the standard (ANC-5) data, the fabricator must obtain this information by physical testing and publish it for design use. This information includes tension and compression stress-strain curves, elongation, fatigue, bearing, shear and other data needed for design applications.

Preliminary information is issued by the structural analysis group during the preliminary testing for experimental design uses, and the completed data are published for production engineering design.

• **Materials specs.** In the absence of government specifications, a materials spec for design, purchasing and inspection must be formulated. Physical data from the basic tests, together with information from the vendor, which has been spot-checked for accuracy, are used as the basis for the material spec. This establishes allowable variations in properties of the materials due to mill practice, as well as for tubing, extrusions and other raw stock forms. General quality items, such as permissible surface defects and finishes, are also included.

• **Engineering purchasing specs.** This is a tabulation of all materials approved by engineering for purchase. It refers to the applicable spec from which each material is to be purchased.

• **Process bulletins.** These temporary information sheets are used as "what must be done" documents by the manufacturing section for fabrication, processing, assembly, installation and inspection. Preliminary issues are published as information required for manufacturing and engineering becomes available. When the material becomes a production item, process bulletin data are transferred to the process spec, and the bulletin is obsoleted.

• **Process specs.** These requirements are prepared to conform as closely as possible to applicable government specifications within the limits of engineering design and available manufacturing facilities. When the processing of a new material does not fall within the minimum limits of the established process specification, the variation required is noted in the data for the specific material.

• **Manufacturing process standards.** This is a compilation of data obtained on the pilot line and other production tests.

The data covers manufacturing methods to be used on the material and becomes a "how to do it" document for manufacturing, highlighting the new methods required or variations to current methods. The standard complies with limitations stipulated in the process specification.

Because the responsibility for developing a use for the material has been passed on to the airframe manufacturer, he must, to handle this program expeditiously, request the aid of the producer, customer, government agencies and other airframe manufacturers through the Aircraft Industries Assn.

► **Material Producer**—The producer has a very definite responsibility in tailoring the new material to fit the design and production requirements of the aircraft manufacturer, Benjamin says. This responsibility does not end with the announcement of a new material and publication of a preliminary specification—a producer can improve his material for production greatly by following the fabrication problems through the basis tests and evaluating his material from a fabrication standpoint as well as from structural considerations.

It is not always possible to correct fabrication difficulties, but an attempt

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STRUCTURAL DESIGNERS
ELECTRO-MECHANICAL DESIGNERS
ELECTRICAL INSTALLATION DESIGNERS
ENGINEERING DRAWING CHECKERS

Qualified engineers and scientists who wish to locate permanently in Southern California are invited to write for further information regarding these interesting, long-range positions. Include an outline of your experience and training. Allowance for travel expenses.

Address correspondence to

Director of Engineering,
Northrop Aircraft, Inc.
1003 E. Broadway, Hawthorne, Calif.

by the producer to blend his alloys to correct these problems has in the past been possible and should be considered during the early experimental runs of a material, Benjamin claims.

The fabricators realize that there will be difficulties during the experimental mill runs and expect some inconsistencies. But, says Benjamin, too often a producer will ship experimental material without noting deviations from the spec caused by a particular melt or reduction in milling. Indication of these variations (usually within the high and low limits of the preliminary spec) will assist the fabricator. But, due to the experimental nature of the tests, the variation is worth noting, he says.

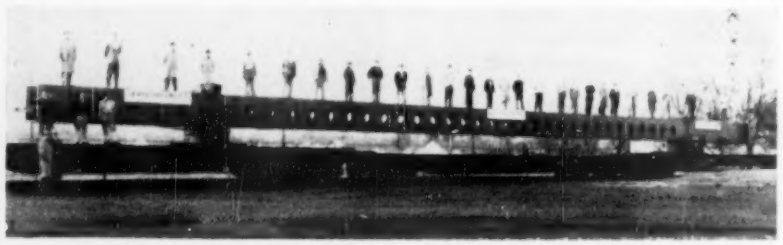
► **Customer's Attitude**—The customer's attitude is either a reluctance to use the experimental material or an extreme desire to use it as quickly as possible to utilize weight-saving or other favorable characteristics.

It is of great advantage to the customer and the fabricator, says Benjamin, to select a suitable part that can be produced on a pilot line operation and installed on the airplane in an accessible location for easy inspection during routine service checks. This procedure will build confidence in the design and with the customer's field service people responsible for the upkeep of the future parts produced.

► **Government Agencies**—The engineer maintains that the development contracts placed by the Air Materiel Command, Bureau of Aeronautics, Ordnance and other agencies have been extremely helpful in expediting the use of new materials.

Results of work under these contracts are available to contractors, who have benefited considerably by this aid. The majority of these contracts are based on selection of production parts which will be produced in the final phase of the contract.

Development costs in the majority of cases will be balanced by the production cost saving of the end product, Benjamin claims.—**Irving Stone**



GIANT bed component, one of two huge assemblies for Alcoa's stretcher to straighten extrusions, is 138-ft. length of welded plates.

Aluminum Stretcher Takes Shape

A huge metal stretcher is beginning to take shape at the Lafayette, Ind., works of the Aluminum Company of America. This giant, capable of a tug of 3 million pounds (AVIATION WEEK Jan. 5 p. 38), will be worked in conjunction with Alcoa-operated extruders under the Air Force heavy press program. The stretcher will be owned by Alcoa.

► **Handles Big Piece**—During the extruding process, large pieces of metal have a tendency to warp and internal strains are built up. The huge stretcher will remedy these difficulties in a single operation.

The complete stretching machine will be about 180 ft. long, 5 ft. wide and will weigh about 1,150 tons. It will accommodate extrusions up to 110 ft. in length and straighten 75S alluminum alloy shapes up to 60 in. in cross-section.

By comparison, the largest stretcher now available can exert a pull of 750,000 lb. and will handle a 75S extrusion of 15 sq. in. cross-section.

Extra safety allowances will be built into the stretcher, because if a piece of metal should break while under maximum tension it could fly off at higher than 100 mph. During the stretching process, 17 million in.-lb. of energy is stored in the piece of metal. This tremendous force had to be absorbed in the stretcher itself in case of a break, Alcoa says.

The machine component shown in the accompanying photo was fabricated in Philadelphia, machined in East Chicago, then routed to Lafayette. It rode on two special flatcars of 250,000-lb. capacity, with a conventional flatcar between.

► **Press Up**—Meanwhile, a 14,000-ton extrusion press already has been erected at Lafayette, after a four-month job by F. H. McGraw & Co., equipment erection organization. The press is a German Schloemann-built job and will handle billets 31 in. in diameter. The cylinder housing alone weighs 107 tons, is 23 ft. long, 8½ ft. wide, 14 ft. high. Platen weight is 103 tons.

PRODUCTION BRIEFING

▶ **Cee-Bee Chemical Co.,** has opened a new 15,000-sq. ft. plant and offices at 9520 Ceebee Drive, Downey, Calif. The new plant cost $175,000. Further expansion is already being considered.

▶ **Thompson Products, Inc.,** is closing its Cleveland sales, manufacturing, shipping and billing departments down for two-week vacation period starting July 27.

▶ **Microloc** is the name of a new firm formed by Stillman Rubber Co., Culver City, Calif., and John F. Drescher, aircraft armament design, to handle research, design and development of electro-mechanical specialties and armament equipment for aircraft and missiles.

▶ **American Gyro Corp.** is new name for company formerly called Instrument Associates of California. Business address, 1509 Colorado Ave., Santa Monica, is unchanged. The firm makes miniature rate gyros for aviation.

▶ **LaSalle Engineering Corp.,** which assists aviation, industrial and automotive firms in tool designing and other engineering problems, has reopened its facilities at Hill Building, 533 F St., San Diego, Calif.

▶ **Gladden Products Corp.,** 635 W. Colorado Blvd., Glendale 4, Calif., is offering its services to aircraft manufacturers on research, development and production of pneumatic products.

▶ **Servomechanisms, Inc.,** is closing its Westbury and New Cassel plants, L. I., N. Y., July 18 through Aug. 2 for vacations.

▶ Goodyear Aircraft Corp., Akron, is producing canopies, radomes and stainless steel ducting for Boeing B-47 photo-reconnaissance planes.

▶ **Douglas Aircraft Co., Inc.,** is transferring 11 major C-124 Globemaster wing and fuselage assembly operations from its Long Beach, Calif., Division to its Tulsa plant. The move is designed to make more room available at Long Beach for building RB-66 twin-jet bombers and related types.

▶ **Kittell-Lacy, Inc.,** Los Angeles, is a new jointly owned subsidiary formed by Lacy Mfg. Co. and Kittell Muffler & Engineering, Inc., to design, build and install complete jet engine silencing equipment for use when engines are undergoing ground tests.

A Northrop Prime

Northrop Aircraft's forward-looking seven-year research in the field of guided missiles has now resulted in actual production for the U. S. defense effort.

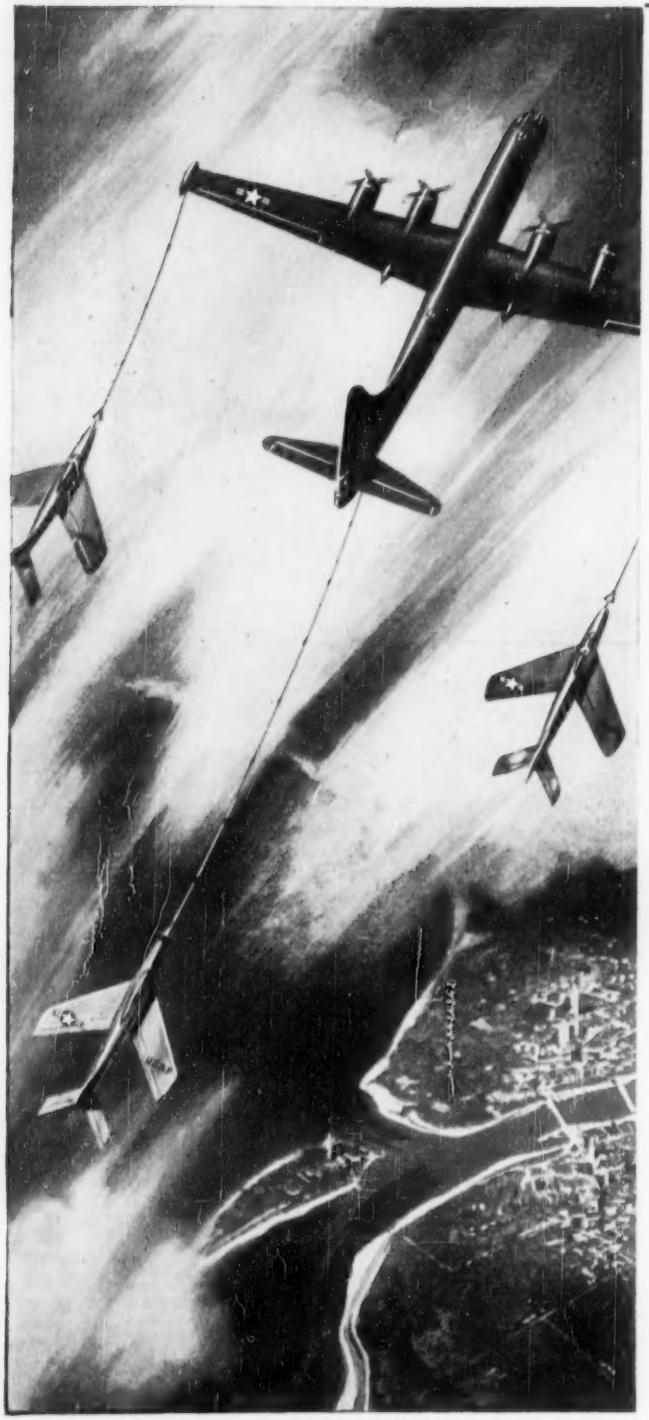
This advanced weapon to protect free people is a prime development of the inventive and productive talents joined in the Northrop organization.

NORTHROP AIRCRAFT, INC.

HAWTHORNE, CALIFORNIA

Pioneer Builders of Night and All Weather Fighters

What JACK & HEINTZ *is doing about...*



For military aircraft, mid-air transfer of fuel from one plane to another means increased range and "pay load".

Probe and drogue system hose-reel assembly powered by J&H motor specially designed for heavy-duty performance.

Successful mid-air refueling of aircraft is one of the more important aviation developments of the past few years. Its importance may be likened to the drastic changes which came about in sea tactics after refueling of task forces at sea was perfected during World War II.

For the Air Force and Navy, it means tremendously increased range and far greater bomb load. It will also save many a fuel-short fighter returning to base or carrier deck.

Combining simplicity and safety, the probe and drogue system, perfected by Flight Refueling, Inc., permits fast refueling of *one* to *three* planes simultaneously. On the tanker airplane, there are one to three compact hose-reel assemblies which let out a length of hose to the end of which is attached an automatic coupling within a funnel-shaped drogue. The receiver aircraft is equipped with a protruding probe which the pilot merely flies into the drogue. The disconnect is made simply by slowing up the receiver aircraft.

Each hose reel is driven through a torque converter by a powerful Jack & Heintz motor of special design, built through co-opera-

JACK & HEINTZ

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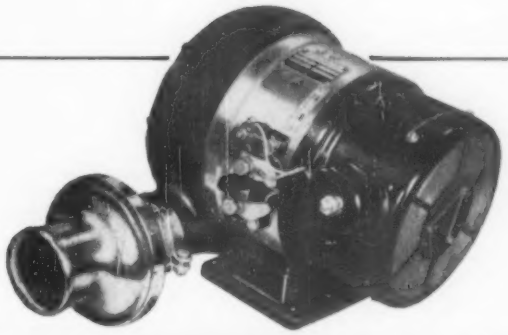
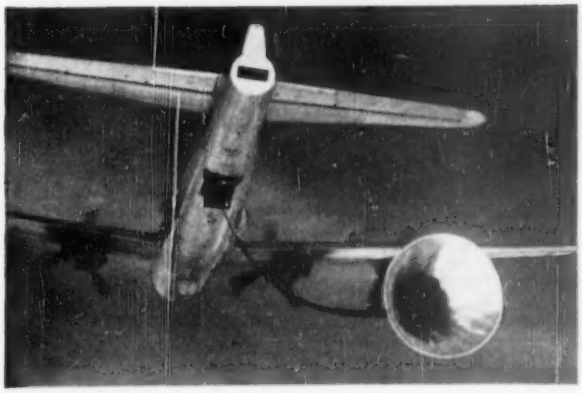
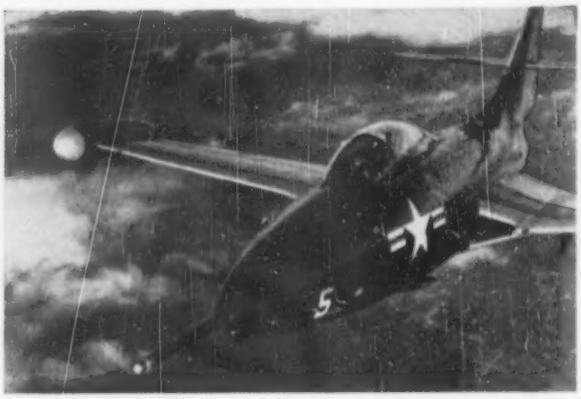
MID-AIR REFUELING



This specially designed J&H Model DA55-1 Motor powers hose-reel assembly used by probe and drogue system. Standard-type flame arrester, in view at left, is mounted in exhaust duct. Integrally mounted flame arrester in air inlet, seen at right end of motor housing, reduces motor length.



Receiver plane's view of a tanker's funnel-shaped drogue. Flexible hose in this case is paid out and retracted from bomb bay.



This fighter pilot flies nose probe into tanker's drogue where coupling is made automatically. Disconnect is made by reducing flight speed.

tive engineering between Flight Refueling and Jack & Heintz.

The hose-reel motor is a 27-volt d-c, 3600 rpm unit with an output of 9.5 hp on a continuous duty cycle up to the maximum altitude required for the operation. It is self-cooled and provided with a radio noise filter and two explosion-proof flame arresters.

J&H looks to the Future

The requirement for higher refueling speeds and altitudes demands still more powerful hose-reel motors for probe and drogue refueling installations. J&H has developed a 15-hp, 27-volt d-c, explosion-proof, blast-cooled motor—Model DA60—for continuous duty operation at a much higher altitude than possible with the DA55-1. Design is accomplished with only a slight increase in weight and envelope dimensions.

These special motors for mid-air refueling are examples of the unusual problems that are handled by J&H engineers to our customers' satisfaction. J&H engineers will be glad to work with you in designing Rotomotive equipment to meet your needs. Write Jack & Heintz, Inc., Cleveland 1, Ohio.

Rotomotive EQUIPMENT

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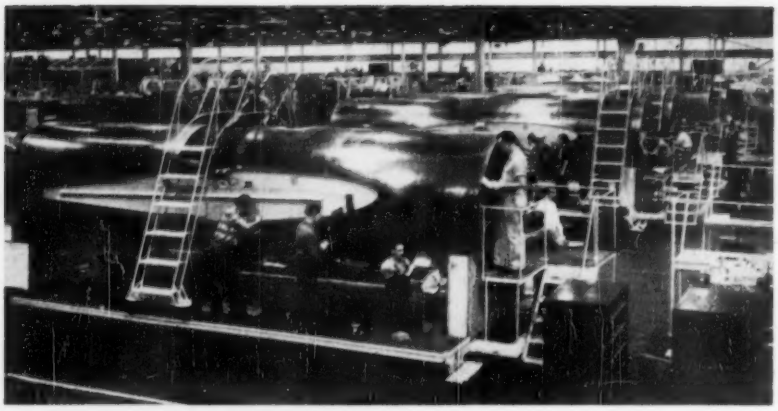
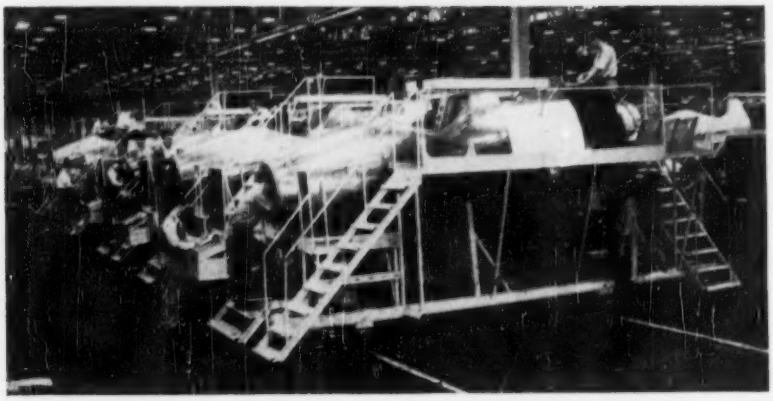
Aircraft Generating Equipment—a-c and d-c—including Control Systems and Components • Electric Starters • Actuators and Special Aircraft Motors • Custom-built Commercial Motors • J&H Eisemann Magnetos

USAF Planes Down the Line, On the Line



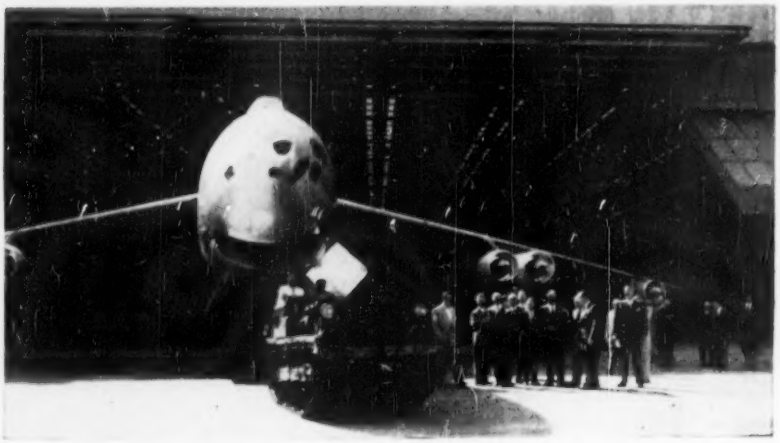


MARTIN B-57 PROGRESS

Assembly of twin-jet Martin B-57A intruder bombers for USAF is progressing rapidly, judging from these photos (above and left) taken in Martin Plant 2. The top picture shows a number of forward nose sections being completed. At left is a view of B-57A mid-fuselage portions which will contain the bomb bay and to which the wings are attached. Bridge-type access ladder is mounted on rails so that it can be moved to any section of the assembly. The B-57A is based on the English Electric Canberra bomber; it will be powered by British-designed Wright Sapphire turbojet engines.

FIRST GEORGIA-BUILT B-47

Rollout of the first Boeing-designed B-47B Stratojet bomber manufactured in Georgia at Lockheed-Marietta is watched by the company's board of directors. Earlier B-47s off the line at Marietta had been assembled from components furnished under the USAF Parts Assistance Program. Lockheed-Marietta completed its B-29 modification program last December and is now turning out Stratojets under license.



JET CENTER EXPANSION

Nearly $500,000 is to be spent in expanding runways, lighting, roads and allied facilities at the Air Force's large military jet plane test center at Palmdale, Calif., where these Lockheed F-94C Starfire all-weather fighters are seen on the flight line. Company is negotiating with the government for construction of three new buildings to handle its present and long-range programs at Palmdale. Northrop Aircraft, Inc., and North American Aviation, Inc., are also slated to utilize the base's facilities.

Thread Insert Tool

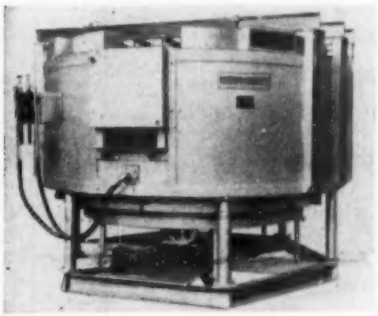
Heli-Coil Corp. has announced an improved tool for easy installation of its stainless steel wire thread inserts used in aircraft engines and other applications.

The tool consists primarily of nylon parts (as compared to steel and aluminum for its predecessor) yet is expected to last 3 to 5 times longer than the older type. Replacement at no extra cost is guaranteed if the tool breaks.

The device has a prewinder on the tip that compresses the diameter of the wire thread insert and aligns its helix to match the helix of the tapped threads to be protected. The tapered nose of the prewinder is placed against the tapped hole, and a handle is turned to wind the insert into the hole—the tool acting as a thread guide.

The inserts can be supplied in aluminum, magnesium, copper alloys, plastics and fiber and are produced in following thread series: coarse and fine; unified coarse and fine; automotive spark plug; and aviation spark plug.

Heli-Coil Corp., 1285 Shelter Rock Lane, Danbury, Conn.



Precision Furnace

Precision control for accurate heating of jet engine parts before forging is offered in a rotary hearth furnace developed by Hevi Duty Electric Co.

Special high-temperature alloys can be heated to exact temperatures ranging up to 2500F in the new electrically operated machine that also can be used

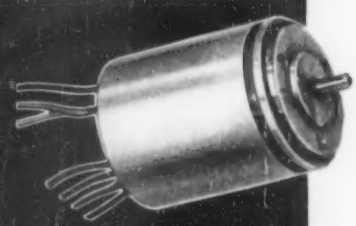
Eclipse-Pioneer

CORROSION-RESISTANT AUTOSYN* SYNCHROS

(AY-200 SERIES)

TYPICAL ELECTRICAL CHARACTERISTICS

	Type Number	Input Voltage Nominal Excitation	Input Current Milliamperes	Input Power Watts	Input Impedance Ohms	Stator Output Voltages Line to Line	Rotor Resistance (DC) Ohms	Stator Resistance (DC) Ohms	Maximum Error Spread Minutes
Transmitters	AY2015-28	26V, 400~, 1 ph.	125	0.8	40+j230	11.8	12	5.8	15
Control Transformers	AY2015-25	From Trans. Autosyn	Dependent Upon Circuit Design				40	10.2	30
Differentials	AY2315-25	From Trans. Autosyn	Dependent Upon Circuit Design				14	10.2	30
Receivers	AY2215-28	26V, 400~, 1 ph.	70	0.4	180+j440	11.8	80	11.4	24



PYGMY AUTOSYN SYNCHROS

(AY-500 SERIES)

TYPICAL ELECTRICAL CHARACTERISTICS

	Type Number	Input Voltage Nominal Excitation	Input Current Milliamperes	Input Power Watts	Input Impedance Ohms	Stator Output Voltages Line to Line	Rotor Resistance (DC) Ohms	Stator Resistance (DC) Ohms	Maximum Error Spread Minutes
Transmitters	AY503-4	26V, 400~, 1 ph.	220	2.5	45+j400	11.8	23.0	11.0	24
Receivers	AY503-2	26V, 400~, 1 ph.	220	2.5	45+j150	11.8	23.0	11.0	75
Control Transformers	AY503-3	From Trans. Autosyn	Dependent Upon Circuit Design				170.0	45.0	24
	AY503-5	From Trans. Autosyn	Dependent Upon Circuit Design				550.0	100.0	30
Differentials	AY533-3	From Trans. Autosyn	Dependent Upon Circuit Design				93.0	45.0	30
Resolvers	AY523-3	26V, 400~, 1 ph.	55	0.5	200+j400	11.8	210.0	42.5	30
	AY543-5	26V, 400~, 1 ph.	11	0.13	900+j2200	11.8	860.0	166.0	30

Available for all applications is the new, *corrosion-resistant* AY-200 Series of Eclipse-Pioneer Autosyn Synchros (1.431" dia. x 1.631" lg.). Where space and weight are prime considerations, Eclipse-Pioneer offers the AY-500 Pygmy Autosyn Synchro Series (0.937" dia. x 1.278" lg.) with corrosion-resistant models available in sample quantities. Whatever your synchro requirements may be, our long experience, modern facilities and advanced production techniques can work to your advantage. For full details, write Department H.

*Registered trade-mark Bendix Aviation Corporation

THE NAME Bendix AVIATION CORPORATION MEANS MORE

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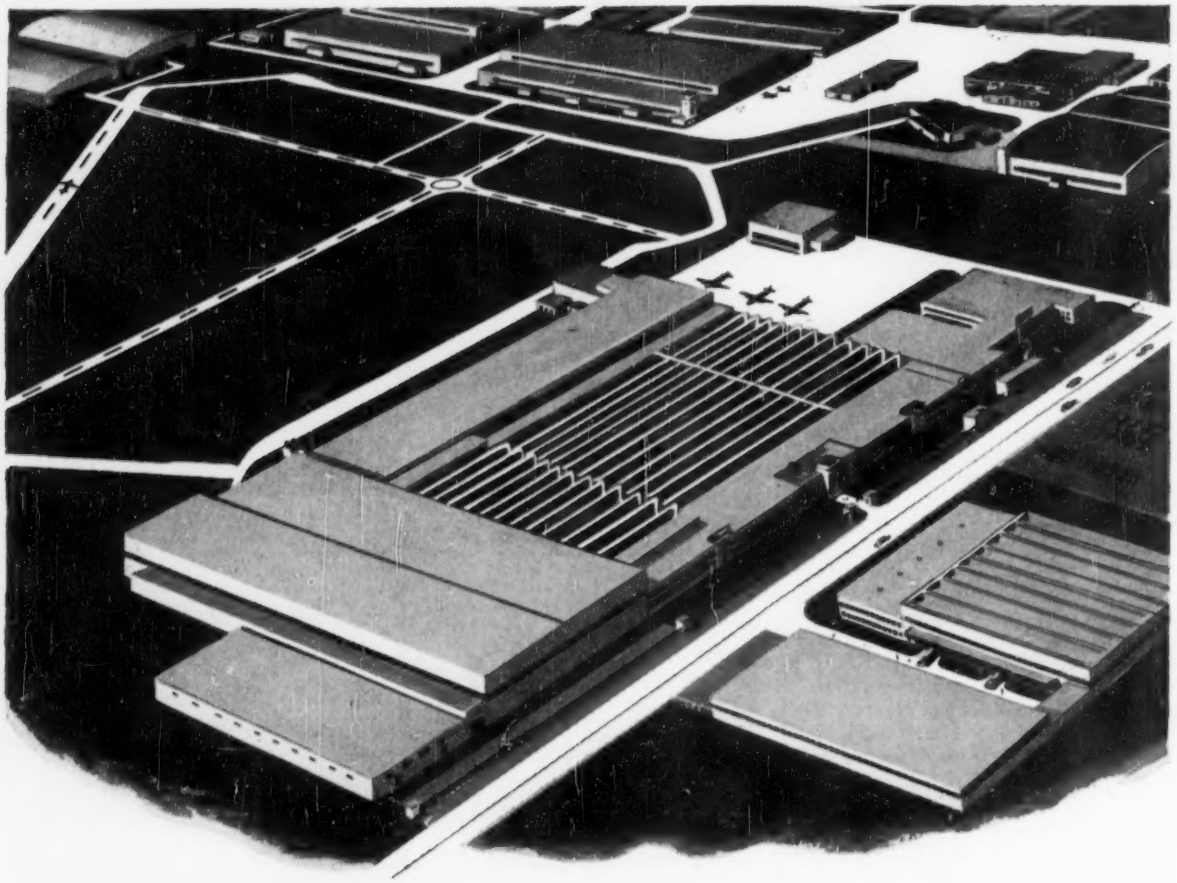
Export Sales: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.



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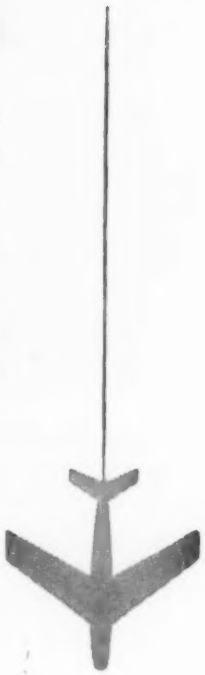


CA53-13UST

for scale-free hardening. It supplies a protective atmosphere to maintain surface brightness and prevent decarburization.

High output through continuous operation (1500 lb./hr.) and minimum down-time also are stressed in the design of the unit. The operator can continually load the furnace by placing the cold parts in the 7-ft. diameter hearth as it rotates slowly and removing the heated parts as they pass the door. Opening is 1½ ft. wide and can be adjusted up to 10 in. high. A water-cooled jacket is mounted over the door opening to make the operator's job easier.

Silicone carbide rod heating elements, arranged vertically around the outer periphery of the hearth, can be removed and replaced while the furnace is hot, reducing need for shut-downs.

The furnace has a 260-kw. rating. Other sizes and models, including rotary hearths with a rectangular shell, also are produced.

Hevi Duty Electric Co., Milwaukee 1.

Navy Contracts

The following contracts were announced recently by the Navy's Aviation Supply Office, 700 Robbins Ave., Philadelphia 11.

A. C. Spark Plug Div., General Motors Corp., Flint 2, Mich., spark plugs for various aircraft engines, 258,175 each, $378,263; 9,525 each, $42,672.

Aerial Machine & Tool Corp., 38-27 30th St., Long Island City, N. Y., belts, pilot, $198,250.

Aero Supply Mfg. Co., Inc., 611 W. Main St., Corry, Pa., throttle lever assemblies for TBM-3 airplanes, 1,524 each, $34,549.

Aerotherm Corp., Bantam, Conn., seat assy., 74 each, $37,408.

Aerotherm Corp., Greenwich, Conn., seat assy., 28 ea., $33,158.

Airheart Products Inc., 13002 Ventura Blvd., North Hollywood, Calif., cable, automatic release units for JRB-SNB aircraft, 4,506 each, $46,502.

American Bosch Corp., 3664 Main St., Springfield, Mass., maintenance parts used on various magneto assys., $26,097.

Armstrong Paint & Varnish Works, 1330 S. Kilbourn Ave., Chicago, enamel, aircraft, 16,448 gal., $37,317.

William Armstrong Smith Co., 109 E. Forrest Ave., East Point, Ga., paint, 25,000 gal., $29,500; enamel, interior & exterior, 64,600 gal., $130,654.

Bendix Products Div., Bendix Aviation Corp., 401 Bendix Drive, South Bend, Ind., stands, carburetor test, $141,926; maintenance parts for strut & brake assys., $160,-161; valve, fuel pressure, & shut-off for use on Pratt & Whitney engines, 101 each, $35,916.

Berger Brothers Co., 137 Derby Ave., New Haven 7, Conn., coveralls & anti-blackout suits, $39,180.

Breeze Corps., Inc., 41 South 6th St. Newark, N. J., actuators, $187,562.

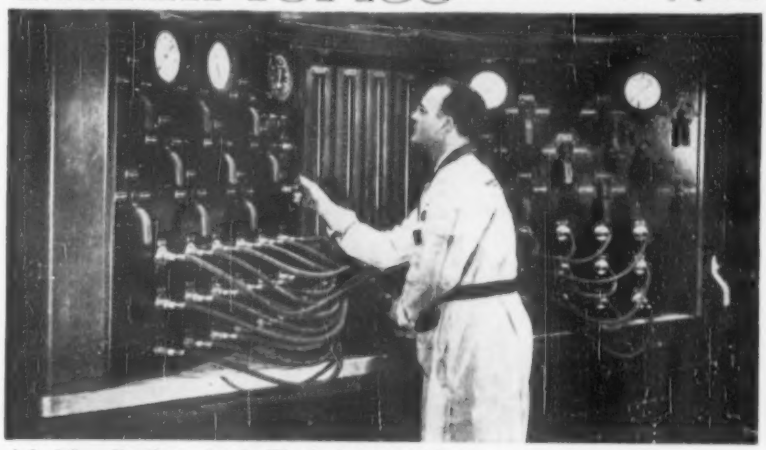
Bristol Mfg. Corp., Buttonwood St., Bristol, R. I., boots, flying, insulated rubber, 8,040 pr., $97,803.

Carbide & Carbon Chemicals Co., div. of Union Carbide & Carbon Corp., 30 E. 42nd St., New York, acetone, 42,770 gal., $32,078.

Champion Spark Plug Co., 900 Upton Ave., Toledo, spark plug for engine R1820-86, 17,175 each, $25,763; spark plugs for various engines, 513,600 ea., $698,496.

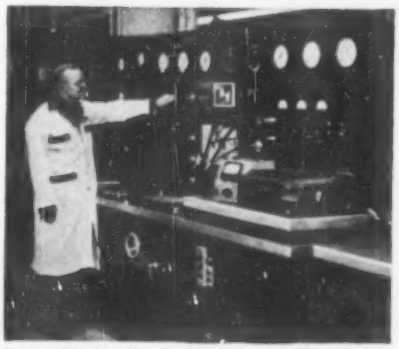
Clayton Mfg. Co., P. O. Box 550, El Monte,

GREER TOPICS **Important News of Aviation & Industrial Test Equipment**

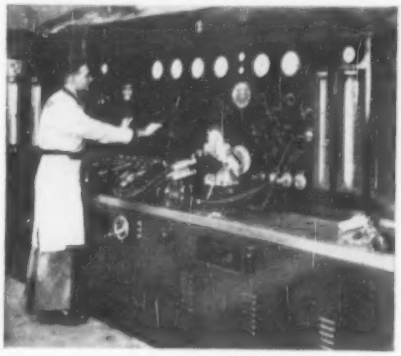


A fuel flow distributor for the Westinghouse J-40 jet engine is checked for accurate and dependable performance by an expert inspector. Greer precision-engineered and built the test machine above to meet the precise test requirements of Westinghouse.

Westinghouse Jet Engines Under Rigid Quality Control



Greer Hydraulic Control Pump Test Stand meets the high quality control standards required at Westinghouse. Components are inspected under simulated flight conditions.



Westinghouse lube pump for J-40 jet engine gets thorough inspection with Greer built test stand. Accurate readings from meters and gauges decide components dependability.

Greer Test Equipment subjects jet components to rigorous inspection

A thorough quality control system is maintained at Westinghouse to make sure each J-34 and J-40 jet engine component will stand up in use. These complex parts are put through gruelling tests under simulated flight conditions to ferret out weaknesses and determine air worthiness. The test equipment *must* give a true picture of performance.

That is why Westinghouse chooses Greer. Because Greer test machines are precision-engineered to give the same accurate, dependable results regardless of place, conditions or operator. Greer equipment is in use the world over by leading aircraft manufacturers and airlines.

Greer designs and builds to meet your out-of-ordinary test requirements, and in addition, has a complete standard line of machines to check all systems of all aircraft—so standardized they can be ordered directly from our catalog.

GREER TEST EQUIPMENT

Greer Hydraulics Inc. 454 Eighteenth Street, Brooklyn 15, New York

Field Offices: 1908 West Cermak Road, Chicago, Illinois • 25 South Main Street, Dayton, Ohio 2832 East Grand Boulevard, Detroit, Michigan • and sales representatives in all principal cities

Starfire efficiency means Air Force economy

The United States Air Force is economy minded. Yet it must and does expect superlative performance from its aircraft.

Take a look at how the Air Force's new all-weather fighter-interceptor, the F-94C Starfire, fills the bill on both counts—performance *and* economy.

Recent operation under tactical conditions shows that the Starfire is a rugged, reliable plane that averages many working hours in the air between servicings. This cuts maintenance costs throughout the life of each plane—a sizable cumulative saving. Furthermore, Starfires are *easy* to service and are therefore quickly back on duty. Less frequent service plus quicker service means *more flying time per plane,* so that fewer total planes are needed by the Air Force—another sizable saving.

At the same time the U.S.A.F. Starfire gives top performance in any weather, night or day. No other fighter-interceptor can reach enemy bomber level faster from a cold start. No other has finer automatic equipment—Hughes Radar System, Westinghouse Automatic Pilot, Sperry Zero Reader, Lockheed Rocket Release. And the F-94C is easy to fly and rock-steady under instrument conditions.

In addition the Lockheed Starfire is a 2-place interceptor, thus utilizing the cooperative efficiency of a 2-man team to perform all the split-second operations of intercepting an enemy (possibly unseen) at 600-mph-plus speeds.

F-94C Starfire

Lockheed *Aircraft Corporation*

BURBANK, CALIFORNIA, AND MARIETTA, GEORGIA

LOOK TO LOCKHEED FOR LEADERSHIP

Lockheed

Starfire Scores First Night Kill on MIG-15

Burbank, Calif.—(Special)—The F-94 Starfire has scored the first night victory over a Russian MIG-15, according to U.S. Air Force dispatches from Korea.

The Air Force announcement was the first disclosure that Lockheed F-94 Starfires were on duty in Korea. Designed essentially for round-the-clock, round-the-calendar home defense, these almost-automatic radar interceptors are proving to be as versatile as other Lockheed jets, including the famous F-80 Shooting Star, America's first operational jet fighter.

Lockheed's jet fighter record in Korea began *when the F-80 Shooting Star became the first airplane ever to shoot down a Russian MIG.* Later, the Shooting Star was assigned a multitude of missions—napalm bombing, ground-support strafing, bombing with 500-pound bombs, aerial interception, photo reconnaissance, close interdiction and many others. In the first year **Lockheed Shooting Stars had flown more missions than all other allied aircraft combined.**

Now the Shooting Star's younger but more powerful brother, the F-94 Starfire, is proving equally versatile both in Korea and at home, where it is on alert to protect major cities from air attack.

Lockheed builds U. S. defense team

Lockheed F-94 Starfires are just one member of the "defense of America" team now in production at Lockheed:

Lockheed T-33 and TV-2 Jet Trainers, in which 9 out of 10 U.S.A.F. and Navy jet pilots are trained, are being turned out at the fastest rate in history following installation of a mechanized final assembly line at Lockheed's Van Nuys, Calif., factory.

Navy P2V Patrol Bombers, holders of the world's distance record, now have improved radar and armaments, expanding their versatility from anti-submarine patrol to long-range reconnaissance.

Super Constellation Transports designed for new turbo-prop power are now in production for special Navy assignments. Other Super Constellations with turbo-compound engines are being produced for Air Force troop transport, hospital planes and cargo.

WV-2 Super Constellations, early-warning aircraft for the Navy, apply an entirely new concept of national defense which expands radar's eyes and ears far beyond the horizon.

B-47 Jet Bombers, designed by Boeing, are being produced for the Air Force at Lockheed's big Marietta, Georgia, plant.

The C-130 Turbo-prop Cargo Transport is the first all-cargo plane designed from the ground up for high-speed turbo-prop power—now tooling for production at Marietta and Burbank.

Today's advanced production is only a part of Lockheed's present concern. For in the Lockheed laboratories at Burbank and Van Nuys, California, as well as Marietta, Georgia, scientists pry deeper into the mysteries of new types of power, new guidance systems, new and lighter and stronger alloys to answer the demands of tomorrow's science of flight.

Calif., cleaner, 29 each, $95,178.

Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland 5, drag struts for PV-2, -3 (all) aircraft, 79 each, $45,343.

Clifford Mfg. Co., div. of Standard Thomson Corp., 152 Grove St., Waltham, Mass., cooler for P2V-5, -6 aircraft, 58 each, $64,320.

Continental Aviation & Engr. Corp., 1500 Algonquin Ave., Detroit 14, maintenance parts for conversion of engines, $219,483.

Dixie Paint & Varnish Co., Inc., P. O. Box 256, Brunswick, Ga., paint, 25,000 gal., $26,950.

Douglas Aircraft Co., Inc., El Segundo, Calif., parts for AD aircraft, $216,165; parts, maintenance for AD-4W aircraft, $67,565; $238,651; protractors, adjuster, $38,746.

Douglas Aircraft Co. Inc., 3600 Ocean Park Blvd., Santa Monica, Calif., maintenance parts for aircraft, $27,567.

Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., transmitter, oil pressure, 64 each, $32,788; switches & transmitters, $28,368; indicators, $63,503; instruments for various aircraft, $45,511; indicators & transmitters, $46,646; pump assy., fuel, for use on Pratt & Whitney engines, 101 each, $54,978; bearings for various aircraft, 74,600 each, $191,722.

Sigmund Eisner Co., 2-40 Bridge Ave., Red Bank, N. J., belt, pilot, safety, $186,332.

Emerson Electric Mfg. Co., 8100 Florissant Ave., St. Louis 21, armament spares for P2V-5 & P2V-6 aircraft, $78,300.

Fairchild Engine & Airplane Corp., Stratos Div., Bay Shore, L. I., N. Y., turbine assy., power, for F2H-3 aircraft, 506 each, $2,516,635.

Foote Bros. Gear & Machine Corp., 4545 S. Western Blvd., Chicago, actuators, wing pin pull, for F2H-1, -2 aircraft, 228 each, $134,291; screw jack assy. for F2H-3 aircraft, 262 each, $105,590.

Gabb Special Prod., div of E. Horton & Son Co., Windsor Locks, Conn., adapters & filling cups, $76,751.

Gates-Mills, Inc., 20 North Market St., Johnstown, N. J., gloves, aviators, leather, $54,083.

General Cable Corp., 123 S. Broad St., Philadelphia 9, cable, watertight & non-watertight, $2,726,429.

General Development Corp., Elkton, Md., spares for ZP2K, -3K airship program, $30,407.

General Electric Co., 1405 Locust St., Philadelphia 2, generators, $34,366.

General Metals Corp., 10777 Van Owen St., Burbank, Calif., cartridge, 1,065 each, $31,258.

Goodyear Tire & Rubber Co., Inc., 1144 E. Market St., Akron, maintenance parts, used on brake assys. for TBM-3E aircraft, 35,000 each, $225,572; wheel assy., 1,259 each, $203,447.

Grimes Mfg. Co., 515 N. Russell St., Urbana, Ohio, lamps & lights, $61,096; parts for general application on aircraft, $257,468.

Harley Soap Co., Pearce & Orthodox Sts., Philadelphia 37, cleaner, 250,000 lb., $39,729.

Hewlett-Packard Co., 395 Page Mill Road, Palo Alto, Calif., test oscillators, high power termination X-band test set, capactive voltage divider, $26,595.

Holley Carburetor Co., 5930 Vancouver Ave., Detroit, governor drive shaft, for Holley fuel control, used on various aircraft, 5,752 each, $104,284.

Hydro-Aire Inc., 3000 Union Ave., Burbank, Calif., filter assy, fuel, for F2H-1, -2 (all) aircraft, 275 each, $31,331.

Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst, N. Y., indicators for various aircraft, 160 each, $40,513.

Lear Inc., Rome Div., Abbe Road, Elyria, Ohio, pump assys., $105,249.

M. B. Mfg. Co., Inc., 1060 State St., New Haven, Conn., maintenance parts used on mounts for JRM-2, R6V-1 and P4M-1 aircraft, 900 each, $69,736.

Marotta Valve Corp., Boonton Ave., Boonton, N. J., valve assys. for various aircraft, $37,845.

N.S.T. Corp., 2653 S. 5th St., Philadelphia, Pa., antennas, $34,329.

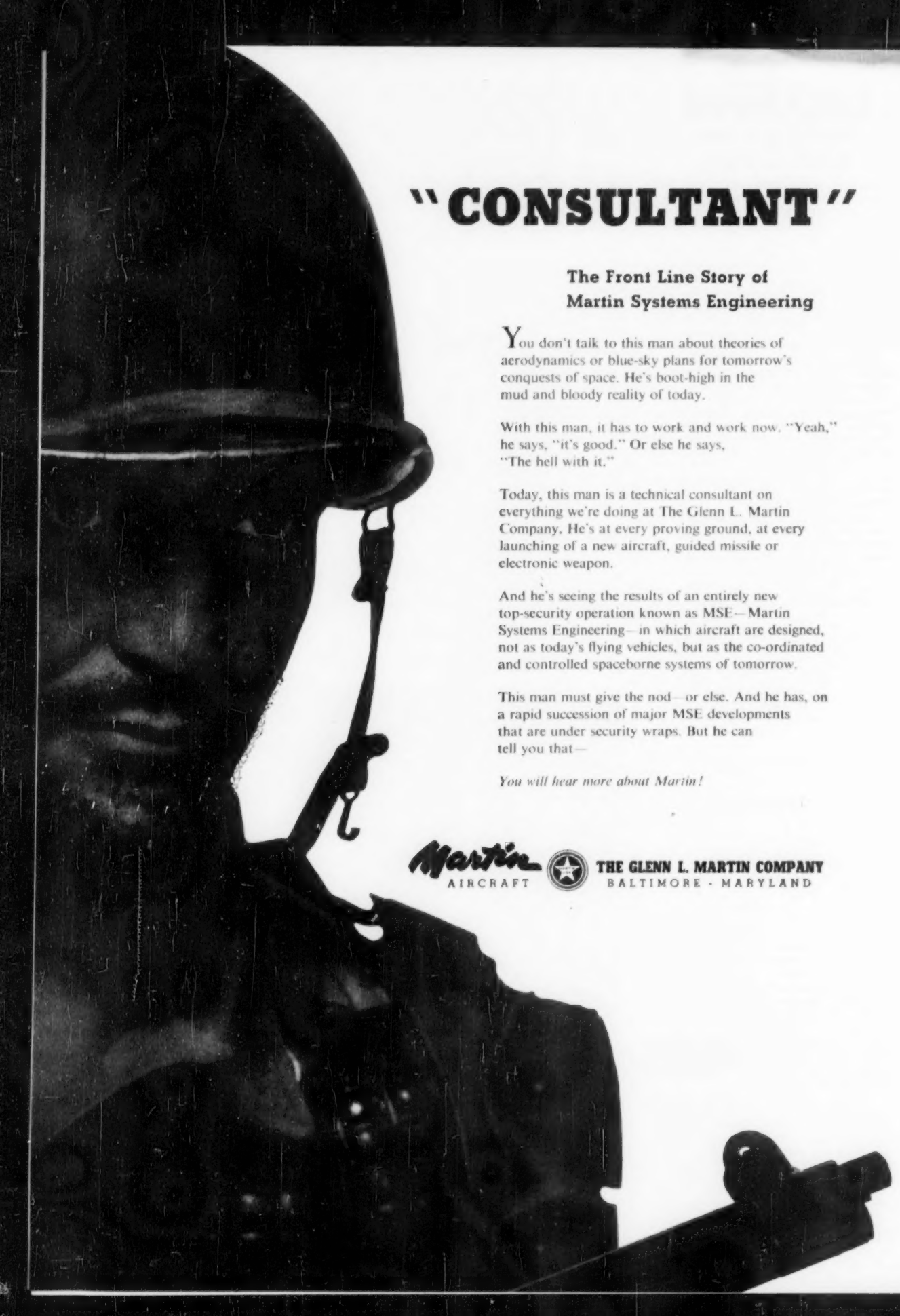
New York Rubber Co., 100 Park Ave., New York, boat, life, CO_2 inflatable, 184 each, $114,098; raft, pneumatic, 1-man, type C-2A, 18.994 each, $1,042,581.

North American Aviation, Inc., Columbus div., 4300 E. Fifth Ave., Columbus, Ohio, parts, maintenance, various for AJ-1 aircraft, $47,986.

Octagon Process Inc., 15 Bank St., Staten Island, N. Y., methylene chloride, $26,763.

BUILDING BLOCKS FOR ENGINE JIGS

A system of small-piece basic parts is being used at General Electric Co.'s Evendale, Ohio, jet engine plant for creating jigs and fixtures used in machining and assembly work. These production units are used in drilling, reaming, tapping, milling, and other shop operations. The arrangement results in substantial time savings in manufacturing parts in small quantities, G-E reports. Considerable economies can be made by assembling dependable temporary tooling to almost any design. When the job is completed, the tooling can be disassembled for use on another part. Known as the Wharton Universal Jig and Fixture System, the parts set is composed of interlocking blocks, clamps, bolts, bushings and other units totaling about 450 basic pieces.



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USAF Contracts

Following is a list of recent USAF contracts announced by the Air Materiel Command.

Bendix Products Div., Bendix Aviation Corp., South Bend, Ind., brake assy., 297 ea., 780 ea., 774 ea., $1,048,596.

Burke & James, Inc., 321 S. Wabash Ave., Chicago, Ill., lens, camera, 65 ea., lens, objective, 20 ea., lens, camera, 125 ea., $33,207.

Douglas Aircraft Co., Inc., Santa Monica, Calif., scoring camera kits, $45,369.

Eicor, Inc., 1501 W. Congree St., Chicago, Ill., phase inverter 4,392 ea., 450 ea., 1,374 ea., $586,285.

Electric Storage Battery Co., Philadelphia, batteries, acft., storage, 244 ea., 37 ea., 425 ea., $202,531.

General Electric Co., 1 River Rd., Schenectady, N. Y., turbosuperchargers, 865 ea., $3,863,955; C11B turbosupercharger regulator systems, 596 ea., $512,560.

B. F. Goodrich Co., 500 S. Main St., Akron, de-icer, 143 ea., 311 ea., $30,624.

Goodyear Tire & Rubber Co., Inc., 1144 E. Market St., Akron, wheel assy., 1,000 ea., 1,000 ea., brake assy., 1,232 ea., $1,732,339.

Gould-National Batteries, Inc., Depew, N. Y., batteries, acft. torage, 4,673 ea. $202,574.

Jack & Heintz, Cleveland, motor generator, 600 ea., 400 ea., data, $120,586; inverter, 712 ea., 714 ea., component spare parts, $419,121; generators, 357 ea., 36 ea., 325 ea., $351,571.

Libbey-Owens-Ford Glass Co., Toledo, glass windshield armor $111,724.

Maxim Silencer Co., Hartford, Conn., engine test cell silencing equipment, $232,744.

Omaha Industries, Inc., 1305 Farnum St., Omaha, fuel servicing trailer, 361 ea., spare parts, $862,923.

Scintilla Magneto Div., Bendix Aviation Corp., Sidney, N. Y., ignition analyzer assy., 1,163 ea., ignition analyzer kit, 524 ea., 338 ea., $2,316,380.

Sperry Gyroscope Co., Sperry Corp., Great Neck, N. Y., power supply amplifier, 25 ea., generator, 60 ea., cycle switch, 21 ea., $53,058.

Stratos Div., Fairchild Engine & Airplane Corp., Bay Shore, N. Y., control valves, 117 ea., 9 ea., $91,350.

Ternstedt Div., Box 1000, Plymouth, Mich., indicator, 1,329, ea., 71 ea., spare parts, $361,032.

Wilcox Electric Co., Inc., 14th & Chestnut St., Kansas City, Mo., radar set components, 744 ea., $713,443.

Charles Beseler, 60 Badger Ave., Newark, N. J., projectors and instruction books, $26,788.

General Electric Co., 1 River Rd., Schenectady, N. Y., 400-amp. generator, 27 ea., 3 ea., 2 ea., 27 ea., $35,317.

B. F. Goodrich Co., 803-4 Winters Bank Bldg., Dayton, brake assy., 21½ x 4½, 120 ea., 125 ea., 127 ea., $176,438.

Inter-Mountain Theatre Supply Co., 264 E. First South St., Salt Lake City, printer per spec. MIL-P-10096A, 59 ea., instruction book, 200 ea., spare parts, $37,222.

Kearfott Co., Inc., 1150 McBride Ave., Little Falls, N. J., Type V-8 indicators, directional, gyroscopic, 5279 ea., $786,223.

Lackner Co. Inc., 1115 York St., Cincinnati, cabin pressure indicators, 837 ea., $32,887.

Lewis Engineering Co., 339 Church St., Naugatuck, Conn., indicators, temperature, multi-function Type MS 28009-1, 671 ea., $25,212.

J. A. Maurer, Inc., 37-01 31 St., Long Island City, N. Y., camera body, strike camera, 820 ea., camera magazine, strike camera, 820 ea., $1,100,065.

McDonnell Aircraft Corp., St. Louis, flight test of XF-88B airplane by govt. pilots prior to acceptance by govt., $40,338.

Minneapolis-Honeywell Regulator Co., 2600 Ridgway Rd., Minneapolis, Type B-1A indicator, 1139 ea., Type K-4 control, 1082 ea., spare parts, $5,396,061.

North American Philips Co. Inc., 100 E. 42 St., New York, C758A control panel, 183 ea., $25,241.

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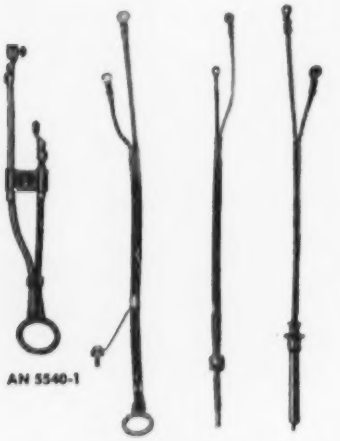

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LETTERS

'Grey Beard' Bearded

I'm afraid your "Grey Beard" has stirred up a "hornets nest" again ("'Grey Beard' Replies," AVIATION WEEK May 18, p. 98). I, among many, didn't ask for the slant toward economics but he did. I, among many, recognize the value of experience as he does but the issue that started this whole mess was the relations of experience and ability. Since the issue of economics was raised it seems only fair to straighten out the record.

In your issue of Mar. 2 you gave figures of airline pay ranging from $978 per month to $1,266, depending on type of equipment flown. The service pay has no such relationship but is generally half the amount quoted for airline pay. This should be irritating enough but let me examine the uninformed statements given by the "Grey Beard."

Mr. "Grey Beard" refers to ¾ of wages for retirement. This is not a fact. More correctly it is 2½% per year of service if you happen to be eligible, which depends upon a lot of factors. It isn't in any case ¾ of wages, but closer to ¼ of the active duty pay, again if you happen to be eligible.

There is no one in the service getting "rent free." There is none in the service who gets his uniforms free. There is no such thing as getting groceries "tax free." As far as the moving expenses are concerned I personally experienced losses at departure point from loss of rent paid, and incurred losses at the arrival point due to living in a hotel with two children without reimbursement. Does that sound like rent free, or payment for moving expenses? I suggest that "Grey Beard" come out from behind his Rip Van Winkle attire and get the facts straight.

Mind you, I have the highest regard for airline pilots' ability, and equal regard for service pilots' ability. I also recognize the requirement for experience. I do seriously object, however, to reports based upon ill-founded information. I expect that you will find space to make retraction of those portions of the letter from Mr. "Grey Beard" which are completely erroneous and untrue.

LCdr. R. W. KOBERG
New Milford, N. J.

Rear-View Mirrors

Have read William E. Irving's comments in your recent letters column on my collision editorial. As you can guess, I can't resist commenting.

Mr. Irving's letter comes as an unexpected but most welcome surprise. As I pointed out in the original editorial, there appears to be quite a bit of truly "blind" flying going on in those airliners' cockpits, even under the best VFR weather conditions. Mr. Irving has, I believe, done all of us a service by pointing out very effectively that there is truly a lot less looking around by airline pilots than there should be.

This may come as something of a surprise to some of our more emotional airline-pilot critics, but AOPA has for some time been working on what might very well be (to the airline pilot, at least) an unbelievable theory. We have the idea that the reason for so many of these near-misses and actual collisions must be a lot deeper than the simple fact that the pilots just negligently aren't looking where they are going. I've had my suspicions for some time—and now Mr. Irving has contributed a good deal toward giving us something to look into further.

Just recently I have had a couple of informal talks with CAB safety people on that very subject. Assuming (as I do) that all airline pilots are not maliciously creating mid-air hazards by their carelessness, the question appears to be one of looking into just what are the causes for some of the near-misses and collisions involving airline aircraft that we've been having. My personal hunch has for some time been that these pilots have the odds stacked against them, and that the safety people—who profess to want to do something about the problem—should at least look at some of the factors that surely are causing otherwise-prudent airline pilots to not look where they're going as much as they should.

Mr. Irving has given us some excellent leads, and I have strongly commended his helpful letter to the attention of the CAB safety people. Just look at what those pilots have to cope with during the course of a routine approach and landing, or during a takeoff climb! I'm not surprised that they're often too busy to look out the windows. It seems to me to be imperative that these safety people make a concerted effort to do something to eliminate these "built-in" hazards in the job that must be performed by the average airline pilot.

If both pilots are so busy pulling switches, twisting knobs, shoving handles and reading manua's that they can't look where they're going, then I'm sure they themselves will welcome some help in relieving them of such burdens under conditions of high-density air traffic. And AOPA has already asked the CAB what steps, if any, they plan to take to improve the seriously deficient cockpit visibility of the average airline aircraft.

According to the CAB's own accident reports, it's often the case that the airline pilots might not even have been able to see the other plane even if they had been looking.

As Mr. Irving has so ably pointed out, today's transport aircraft is pretty much of a highspeed derelict under certain conditions, and all other pilots had best keep their eyes peeled so they can get out of the way.

He's right too, when he says a 75,000-lb. airliner isn't hard to see. Unfortunately, in most of the collision cases we've studied, the pilots never had a chance to see the 75,000-pounder because it came up on them from behind.

As I've said before, it appears that the best anti-collision device these other civilian planes could get is not radar or anything

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Low-Noise Sparking

Prompted by your editorial "How to Publicize Your Company" in a recent AVIATION WEEK, I am writing to acquaint you with the developments we have made in reduction of ignition noise in L/MF and VHF radio receivers operated in conjunction with unshielded aircraft engine ignition systems.

We have developed, obtained CAA approval on, and are now manufacturing Safir B-57 (18-mm.) and Safir B-70 (14-mm.) unshielded spark plugs that definitely reduce the ignition noise caused by the high-voltage portion of the unshielded ignition system to the point where good readable radio reception is possible without resorting to the increased cost weight and service troubles of completely shielded ignition systems.

These spark plugs should be a boon to owners of aircraft with unshielded ignition systems who wish to obtain good radio reception at a minimum of cost. They should be a boon, too, to the engine manufacturer or aircraft manufacturer who wishes to keep the cost of his product at a minimum.

We have available test reports showing the endurance properties of our Safir spark plugs, their performance compared with popular spark plugs now in general use, and the degree to which the ignition noise can be eliminated by using Safir spark plugs.

We will be pleased to furnish any additional information you may desire.

FRANK H. HIGHLEY, Manager
Safir Sales Div.
United States Quarry Tile Co.
217 Fourth St., N. E.
Canton 2, Ohio

Electronic Fuel Gage

The AVIATION WEEK article, "Meter Measures Fuel Flow in Pounds," in the issue of Apr. 6, was of considerable interest to my associates and myself as employes of one of the leading companies in the field of design, development and manufacture of electronic fuel gages for the aircraft industry.

We would like to point out, however, that you made one very misleading statement in the article. In discussing the density variations between jet fuels, you state: "This explains why military jets have been switching to gravimetric float-type gages to measure fuel quantity in pounds rather than gallons". Actually just about the opposite is true.

Current government specifications covering fuel quantity gages specifically call for capacitance-type gages (specs MIL-G-7817 and MIL-G-7818) rather than float type.

For example, our company has been manufacturing electronic (capacitance) type fuel gages for over four years; and we are currently supplying this type of equipment for more than 50 different military aircraft,

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Valve Talk

for WM. R. WHITTAKER CO., Ltd.

by Marvin Miles,
Senior Member, Aviation Writers Assn.

The letter to Whittaker from the observer training wing commander read in part:

"This base sincerely appreciates the invaluable assistance rendered by your company in correcting the internal leakage on Valve, Part No. WE 460- 1¼.

"Representatives of your company cheerfully and eagerly worked overtime to solve the problem during the engineering investigation . . . The modification of valves made by your company in a 16-day period allowed this base to return the TB-50H aircraft to flyable status in a minimum length of elapsed time . . ."

This letter refers to a typical example of Whittaker field service men operating under the pressure of grounded aircraft.

It started late last year when Mather A.F.B. reported erratic leakage in the TB-50H fuel management system, primarily four clusters of three 1¼-inch gate valves each. Gauges showed increased pressures, indicating internal leakage, but the mystery was why a given valve should leak now, yet seal tight a half hour hence.

Glenn Whitaker, Vice President, Field Engineering; Tom Loughan, head of Whittaker's field service; Phil Terry, field engineer; and Ed Skei, liaison engineer, flew north to tackle the problem with Boeing resident representatives and Air Force engineers.

In little time they found what they thought was the answer: In tightening down the valves at the plant, gasket sealing compound had been squeezed inside, and deteriorated the port seals, gumming up the slides.

All the valves consequently were cleaned out and re-installed on the TB-50H's.

Case closed – for about two weeks, that is.

Then a frantic trouble call. The valves were leaking again, and badly. The big four-engine ships were grounded, the training program halted. Air Force officials demanded action – and fast. The heat was on!

Tom Loughan, just returned from Dayton, boarded a plane for Mather with nothing more than a quickly purchased toothbrush.

"The valves would work perfectly on one flight and leak like sieves on the next," he told me grimly. "No one could figure out why. Everyone had a different idea, but nobody had the answer.

"We all pitched in together on the problem – the Mather boys, Boeing reps, Air Force experts from Washington and the Oklahoma City Air Materiel Area. There was absolutely no rhyme or reason in the leakage. And meanwhile those big birds were hugging the ground with the Air Force definitely unhappy.

"At first we thought it was the rigid installation. So we rigged a complete cluster with flexible lines and went up to try it out. When we shut a valve down tight, the engine didn't even cough! In fact, it kept booming along at rated r.p.m. for some time just on leakage alone! A few minutes later we tried it again and the engine stopped instantly. How do you figure a thing like that?

"We'd run the engines on the ground. Two and three would be leaking madly, the others tight. Fifteen minutes later it would be just the reverse. Yet on the test stands they all worked perfectly. Nothing made sense. We were going nuts!

"On the tenth night, for some reason I recalled a bit of conversation I'd heard in Dayton. It was something about the crude synthetic rubber from which we had compounded some ring seals, having been hit by a wild catalyst some time back.

"I checked with the plant and found that for a brief time there had been a high rejection rate on the seals. Then **Luke Hiltner,** Whittaker's research chemist, found that rings made from compound containing the wild catalyst would soften in 115/145 fuel just enough to hang up on the throat of a valve. But only now and then, mind you.

"Oddly enough, the rings weren't affected by anything else, by 100 octane or by jet fuel or – what's worse – by Stoddard solvent, which is universally used on test stands. That's why the leakage showed up only on Mather's TB-50H's which used 115/145 and apparently were the only ships to get valves with these particular rings that had passed inspection."

Once the trouble was isolated, Whittaker rebuilt the valves, replaced the leaking seals with impervious Teflon seals, and in ten days the first rejuvenated Boeings were in the air again. In less than a month the entire fleet was back on training schedule.

Hence the commanding colonel's letter of commendation:

"This base sincerely appreciates... Please advise all (your personnel) that their efforts enabled this base to once again meet its training requirements."

including the most modern jets such as: B-52A, B-47, F3D-2, A3D-1, B-57A, F2H-3, F3H-1, F-101, F-89D, F4D and others.

To the best of our knowledge, there is only one military jet fighter actually flying today that uses the float-type gage. That type of equipment has been considered outmoded and obsolete for some time.

As one of the leading companies in the field, you can naturally understand our concern regarding your statement. We hope you can make the necessary correction of fact.

JACK SCHRIER,
Aviation Engineering Corp.
Field Engineering Manager
Woodside, L. I., N. Y.

(The sentence in question and those preceding it were intended to point up the reason for the postwar switch to fuel quantity gages which measure mass rather than volume. We did not intend to suggest that the capacitance-type gage was on the way out. Although at least one major aircraft manufacturer is using a gravimetric float-type gage to measure fuel quantity, the mass-measuring capacitance-type gage is currently in favor, as Mr. Schrier's letter indicates.—ED.)

Noise Suppression

In your May 18 issue, page 40, we noticed a feature article on the A. V. Roe jet test cells. This article incorrectly stated that the noise suppression system was designed by Giffels & Vallet of Canada, Ltd. Giffels & Vallet were the architectural engineers on the test cell proper. The silencing system, however, was completely designed, engineered, constructed and installed by Industrial Sound Control, Inc.

We are somewhat proud of this cell design, since we feel that A. V. Roe has certainly the quietest test cells in the country. Standing 100 feet from the test area it is not possible to hear whether the engines are being tested or not, even though there may be as many as six engines running at full military power.

For these reasons we feel that we must write and correct the misinformation published in the article.

The facts which we stated above may be further confirmed by contracting either A. V. Roe or the Canadian or Detroit office of Giffels & Vallet.

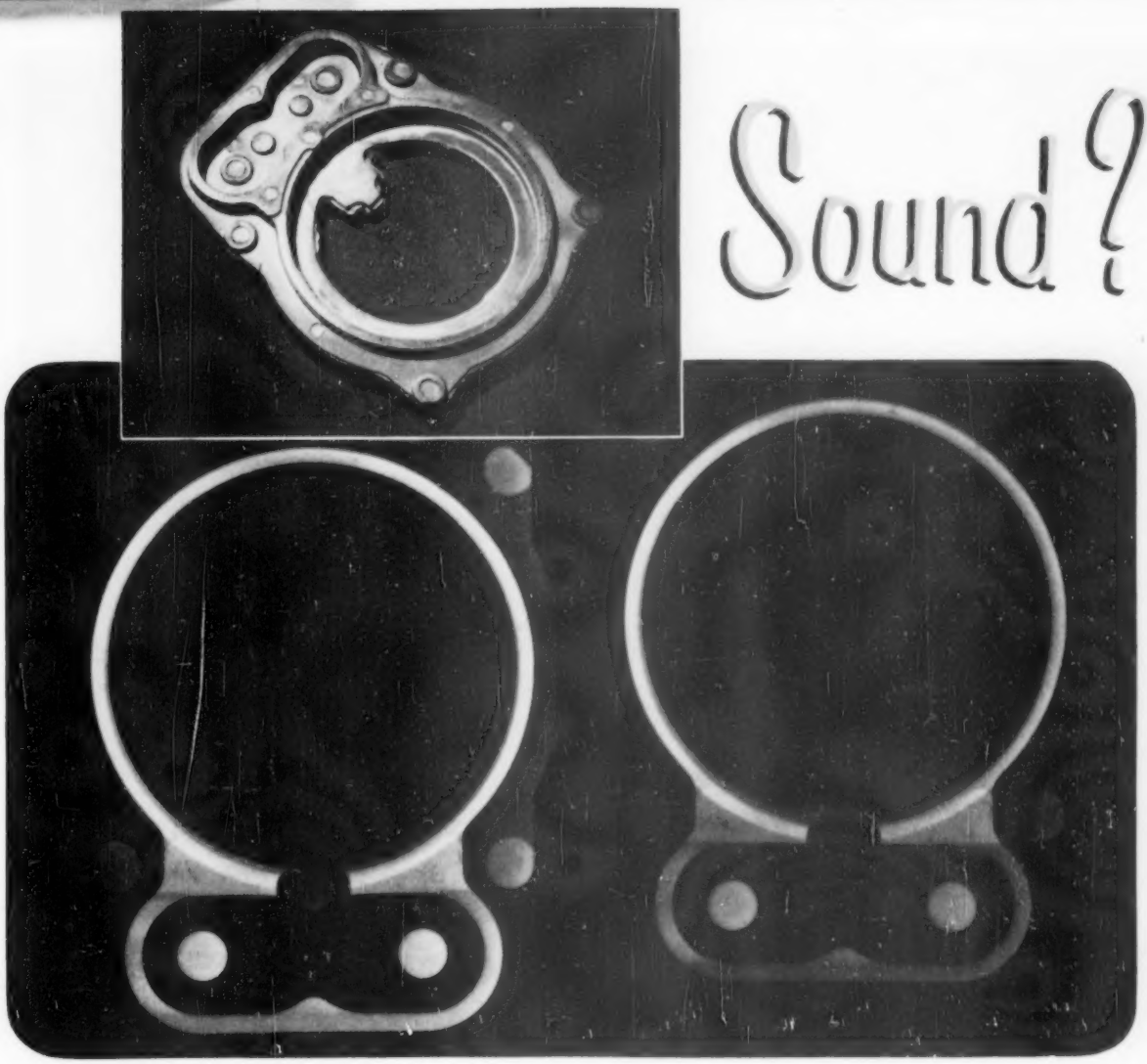
RICHARD D. LEMMERMAN, Vice President
Industrial Sound Control, Inc.
45 Granby St.
Hartford 12, Conn.

Aircraft Profits

Thanks for sending me the advance proof of your fine editorial "What Happens to Aircraft Profits?" (AVIATION WEEK May 25). Mr. Allen joins me in thanking you for your prompt and excellent treatment of the subject.

Let us know if we can provide any further information either from Boeing or from AIA that would enable you to follow this subject up in subsequent issues.

HAROLD MANSFIELD, Director
Public Relations and Advertising
Boeing Airplane Co.
Seattle 14, Wash.



Sound?

Radiography removes the doubt

With the plane headed home and landmarks all "zeroed-in," the soundness of this casting becomes vitally important. For it is part of an aircraft instrument which must be accurate without fail.

That is why each of these castings is subjected to the searching eye of radiography. It is the way to be sure no hidden flaw, no gas holes or porosities exist.

Proving soundness with x-rays has become common practice with more and more suppliers of quality castings. They have found it helps build an enviable reputation for delivering only good work. And besides, by radiographing pilot castings, changes in procedures are frequently indicated which increase the yield in long runs.

If you'd like details on how radiography can improve your operations, get in touch with your x-ray dealer. Or, if you like, write us for a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Radiography...
another important function of photography

Kodak
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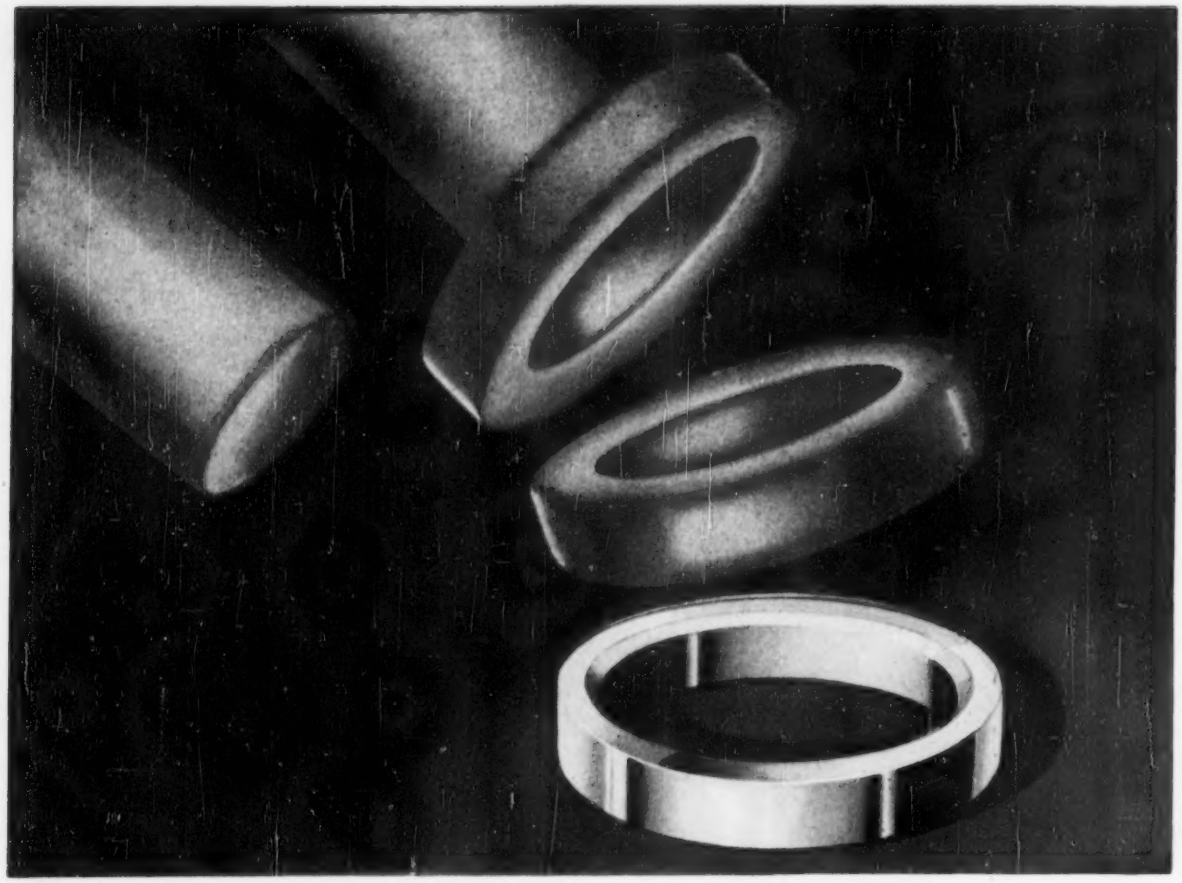

Forged-in Quality means Longer Life for Eaton Valve-Seat Inserts

Eaton steel valve-seat inserts are made from hot-upset and pierced blanks. The forging process improves the physical characteristics of the steel, and provides superior wearing qualities in the finished inserts.

The Eaton Saginaw Division is equipped by years of experience, and modern specialized equipment for the high-volume production of seat inserts in all types and sizes—iron and steel, puddled or plain—for aircraft, motor cars, trucks, tractors, and Diesel engines.

EATON MANUFACTURING COMPANY

General Offices: CLEVELAND, OHIO

SAGINAW DIVISION: 9771 FRENCH ROAD • DETROIT 13, MICHIGAN

EATON PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springfites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

WHAT'S NEW

New Books

Tall Timber Pilots by Dale White and Larry Florek. Published by Viking Press, New York, 222 pages, numerous photos, price $3.50.

Running a fixed-base operation is one of the toughest, least glamorous and often one of the most dangerous ways to make a living in aviation. The old-time fixed-base operators are a hardy lot and don't often make the headlines. So credit is due the authors for getting out a book that does such a good job describing this business.

Their story details the rugged career of Bob Johnson, Missoula, Mont., garage operator who got into the game with an OX-5 Swallow back in 1924. Johnson built his operation by selling the U. S. Forest Service on using the airplane as a fire-fighting tool. It entailed strictly "seat of the pants" flying with the landing gear and wings brushing trees as the pilots wound their way through canyons and landed and took off from tiny one-way strips hacked out of the woods.

But this is not merely a thriller. There's many a lesson here on how a persistent, calculating operator builds up a business in a seemingly barren territory. Bob Johnson also took on such jobs as spraying and dusting, servicing isolated mine operations, parachuting fire fighters into fire areas, aerial photography, airlifting wounded hunters to hospitals, and dropping feed to snowbound stock to mention a few. It has paid off. Today he operates some 30 planes, from Piper Cubs to Douglas DC-3s.

Tall Timber Pilots is a fitting account of one of the toughest breeds in the flying game.—**EJB.**

Telling the Market

Production facilities for handling aluminum, magnesium and bronze alloy castings in sand, and semi-permanent and permanent mold forms available from Wellman Bronze & Aluminum Co., are detailed in a brochure available from the firm at 12800 Shaker Blvd., Cleveland 20, Ohio.

Stud drivers are comprehensively described in Bulletin 653 available from Heli-Coil Corp., 1363 Shelter Rock Lane, Danbury, Conn.

Advantages of high thermal head heating, with gas or oil, for press forging upsetting extruding, stress relieving of ferrous and non-ferrous metals are pointed up in Bulletin SC-162 being

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Protect Vital Parts
on EVERY TYPE of AIRCRAFT

Choice of the Leading Builders of Aircraft-

FOR more than a quarter century Lord Headquarters for Vibration Control have designed and manufactured bonded-rubber mountings to protect vital aircraft components from vibration and shock . . . to improve the overall operation of aircraft . . . to contribute to passenger and crew comfort. Among the many well known Lord Mountings in the Aviation Industry are (1) Dynafocal Engine Suspensions (2) Instrument Panel Mountings (3) Antennae and Electronic Equipment Mountings (4) Cowl Mountings (5) Actuator Attachment Mountings. There are many others.

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LORD MANUFACTURING COMPANY • ERIE, PA.

LORD BONDED RUBBER
Headquarters for
VIBRATION CONTROL

distributed by the Advertising Dept., Surface Combustion Corp., Toledo 1, Ohio.

Aluminum cast plate and bar for use in tools, dies, jigs and fixtures is described in brochure available. Send request to the Reynolds Metals Co., 2500 So. Third St., Louisville 1, Ky., Box PR.

A-B-C's of Aluminum is attractive 96-page book describing the processing of this metal from mine to finished product, providing detailed background on the industry. Write on letterhead to Reynolds Metals Co., Richmond, Va. The firm is also distributing another booklet, Reynolds Aluminum and the Company that makes it.

Contract is 16-mm. sound Kodachrome movie showing technical features of Cannon plugs and numerous applications and is designed as a training and orientation device for personnel in the electrical, electronic and aircraft fields. Address inquiries to Cannon Electric Co., P. O. Box 75, Lincoln Heights Station, Los Angeles 31, Calif.

Selection of ball thrust bearings is simplified with use of circular sliding calculating device permitting rapid conversion of bearing capacities as required for any given application into terms of rated bearing capacities. Write Aetna Ball & Roller Bearing Co., 4600 Schubert Ave., Chicago 39, Ill.

Design, building, sharpening and reconditioning of broaches, bars and fixtures is covered in brochure, Micro-Precision Broaches, Bars and Fixtures, available from Cleveland Broach, Inc., 1061 E. 260 St., Cleveland 23, Ohio.

Nylon molding powder applications are detailed in brochure being distributed by E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Alloy Spring Steels is an 18-page bulletin comparing the mechanical properties of three alloy steels: nickel-chromium-molybdenum (AISI 6150) silicon-manganese (AISI 9262) and plain carbon spring steel (AISI 1095). Distributed by International Nickel Service, 67 Wall St., New York 5.

Idea to Product details development work in forming thermoplastic sheeting and molding Plastrong reinforced plastics products by Bassons Industries Corp., 1432 West Farms Road, New York 60.

New Publications

Annual report of enforcement and investigations concerning 142 non-air carrier and military plane accidents during 1952 in Pennsylvania shows 124 civilian violations of safety regulations, 33 arrests, resulting in 78 warnings and collection of $1,637 in fines. Report is issued by Pennsylvania Aeronautics Commission, Harrisburg State Airport, New Cumberland.

Aviation Mechanics Bulletin designed to disseminate safety information, is being issued monthly by Flight Safety Foundation, Inc., 471 Park Ave., New York 22.

Angle-of-Attack System, its theory, data and mechanization, is title of initial report developed by Aerodynamics, Inc., a firm formed to explore wing-lift instrumentation. The company is located at 1501 Broadway, New York 18.

Flight is an attractive, profusely illustrated booklet using "comic book" format showing aviation developments from the Wright Brothers to the present. Issued by the National Committee to Observe the 50th Anniversary of Powered Flight, 1405 G St., N. W., Washington 5, D. C.

New Address

Servomechanisms, Inc., has moved its corporate offices to 500 Franklin Ave., Garden City, N. Y.

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You've got your Omni range needle on dead center when you're homing on the famous Esso Wings. Flying executives, private plane owners, commercial airline operators all know the sign of dependable service and high quality Esso aviation fuels and lubricants.

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AVIATION PRODUCTS

1953 *The Golden Anniversary Year of Powered Flight. ESSO Experience in Aviation Began with the Wright Brothers in* ***1903***

EQUIPMENT

AA Speeds Station Messages

American Airlines has put into operation an automatic teletype system which is expected to speed message sending and receiving among the carrier's 70 stations and eliminate errors.

The system does not require the teletype operator to wait his turn in station sequence before sending messages, as previously required on the busy circuits. It stores them in its memory for transmission at the correct time. It has many other features designed to preserve order automatically and expedite the more than 500,000 messages monthly normally sent over American's wires.

▶ **Faster Service**—The system, called the 81-D-1, involving 150 teletype machines, provides for automatic priority of urgent messages and automatic relaying between major stations, functions formerly handled manually. It also is more selective than the system previously in use.

Formerly, every machine on a circuit received a copy of each message transmitted on that circuit, regardless of whether it had been directed to the particular station. This necessitated weeding out by hand and throwing away messages not directed to that station. Occasionally a legitimate transmission might be discarded in error.

Now, a message can be sent to any one of the 150 machines, to any specified group of machines, or to all. Extra speed has been squeezed out by "duplexing" the circuits, permitting simultaneous transmission in both directions on the same circuit.

▶ **Pushbutton Operation**—While other airlines have automatic systems similar to American's, the carrier says its own has some special wrinkles which make it the only one of its kind. Notable among these is a feature permitting automatic pushbutton addressing of air to ground messages. These messages go directly to primary stations and are copied directly on teletype machines.

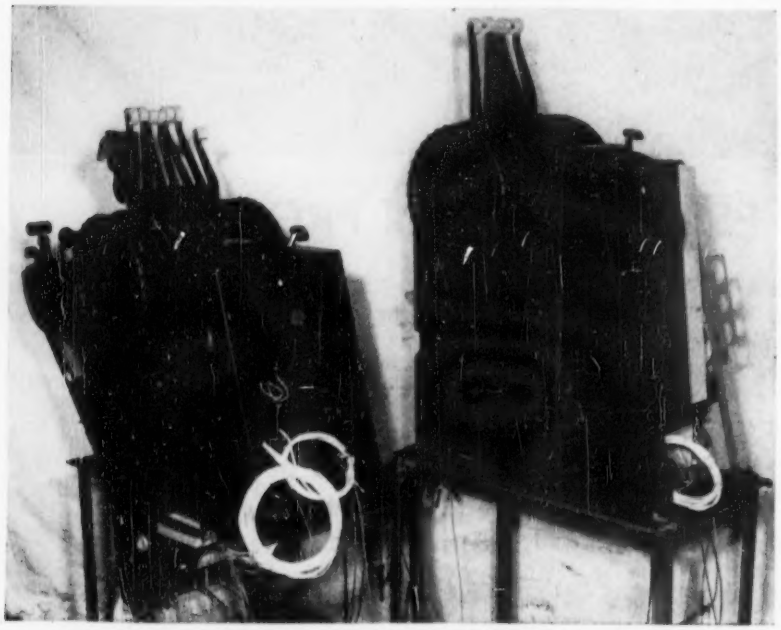
The ground operator, knowing the station or stations that should receive the message, presses one of a series of buttons beside his machine which causes the proper address to be inserted automatically with the text.

The message is then transmitted in normal circuit sequence. All air-ground radio contacts receive priority handling.

▶ **Error Catcher**—Even when there is an error in addressing a message, the new automatic system is geared to catch it, American notes. On reaching main switching centers, incorrect messages are relayed to an intercept machine and held until the address is corrected. Messages also are intercepted when a station is out of order, then sent on when the trouble is cleared.

A number of stations share a circuit and each circuit terminates at one of the three automatic switching centers at New York, Chicago and Fort Worth.

The new setup is designed to keep pace with the expanding needs of the airline, sending messages faster, with less error and duplication.



B-47 EQUIPMENT SUPPLIER EXPANDS

New orders for more than $1 million worth of B-47 Stratojet pilot and co-pilot control stands like the ones pictured above have been received by Associated Controls, Inc., Wichita. The new orders are exclusive of spares. The stands are supplied with wiring ready to be hooked up. To meet military and civil requirements, Associated recently put up a processing plant to supplement its Wichita and Wellington, Kan., manufacturing facilities. The firm, with affiliated concerns—Associated Fabricators, Inc., and Associated Aircraft Sales, Inc.—is handling projects for Lockheed, Douglas, Convair, Cessna, Temco, McDonnell, Ford, General Motors and other companies.

Piston Reliefs

A line of balanced piston relief valves, designed to improve hydraulic system performance in aircraft, have recently passed AN qualification tests, Vickers reports.

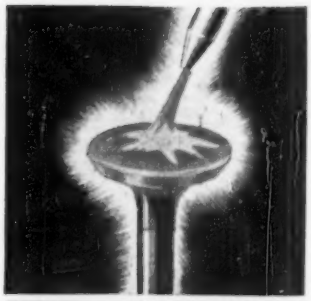
The valves are said to provide smoother operation and greater accuracy through a wide range of pressure adjustments, from 500 to 4,500 psi. They are designed to limit pressure in a hydraulic circuit to the desired maximum.

In a typical application, the valve remains closed until system pressure reaches adjusted relief pressure. Then it opens, allowing oil to return to the reservoir via a tank connection, while maintaining system pressure at the desired maximum.

▶ **Better Than Specs**—These new Vickers models exceed specification requirements, Mil-V-5523, in several important respects, the company claims. Internal leakage is said to be less than required. Tests show pressure variations, from barely open to maximum rated capacity, are considerably less than the specs demand.

The valves are built to function properly through temperatures from −65 to 160F. Though normally of 2-, 5-, or 9-gpm. capacity, they are also available in 16-gpm. models.

They consist of a housing centrally bored along its axis of greatest length. The bore contains all working parts and is ported to two or four outlets on the sides. Working parts are mainly a sleeve and spool subassembly, a large fixed load spring at one end, and a smaller adjustable load spring opposite which retains a control ball in its seat. All parts are held in the housing by a large screw-on retaining cap, through



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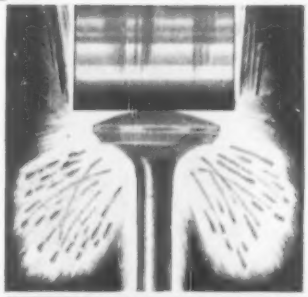
FURNACE HEAT TREATING

These facilities ...this special know-how

...may hold ideas YOU can use NOW



FORGING TOUGH ALLOYS

Every day the Valve Division is welding thousands of pounds of high-alloy coatings to unusual Thompson-developed alloys to give internal-combustion engine valves added life under super-severe service.

We also insert highly-combustible metallic sodium into hollow valve stems to make engine valves run cooler and last longer.

The Valve Division also knows plenty about forging and finishing extra-tough alloys to precision limits.

If you have out-of-the-ordinary production problems, you'll want to know more about Thompson know-how and facilities. And, if you have ideas about how we can help on new projects, we'd like to talk them over with you.

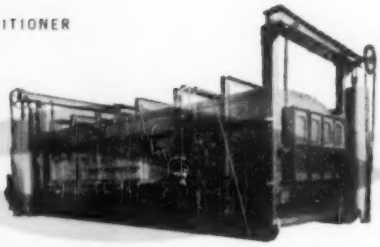
VALVE DIVISION

Thompson Products, Inc.

DEPARTMENT VC-7 • CLEVELAND 17, OHIO

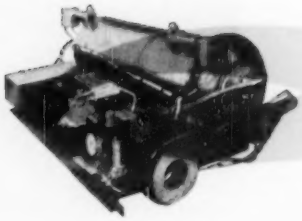
WHAT HAVE THESE GOT TO DO WITH

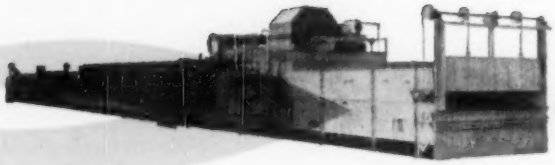
JANITROL WINTER AIR CONDITIONER



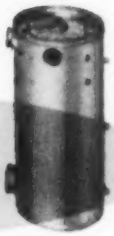
SURFACE HEAT TREATING FURNACE

JANITROL LIQUID HEATER





SURFACE GLASS ANNEALING LEHR



JANITROL AIRCRAFT HEATER

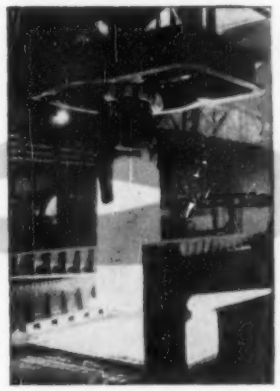
COMBUSTION ENGINEERING FOR AIRCRAFT?

At first glance it might appear that an industrial heat treating furnace, a special atmosphere generator, a glass processing furnace, or a humidity conditioning system would have little to do with aircraft combustion equipment. The fact is, of course, that all this equipment burns fuel and all combustion involves chemical reactions at extremely high speed. The reaction rates are indeed so high that as yet no general combustion theory has been worked out.

Hence those of us involved in developing new combustion equipment, or improving the efficiency of existing combustion systems, must rely heavily on empirical methods. This is the polite way of saying that we must lean on previously accumulated experience on the performance of burners, air mixing systems, ignition equipment, control devices, combustion chambers, and so forth.

Thus the ideas behind all Surface Combustion products are part of our large "storehouse of information" on combustion phenomena. This storehouse is our most vital development resource in dealing with aircraft combustion problems. The ultimate aim, of course, is maximum utilization of every ounce of fuel and every pound of structure in new combustion equipment.

If your project involves combustion or heat transfer in any way, we invite you to call upon the "proven reserves" of experience in the Aircraft-Automotive Division of Surface Combustion Corp.



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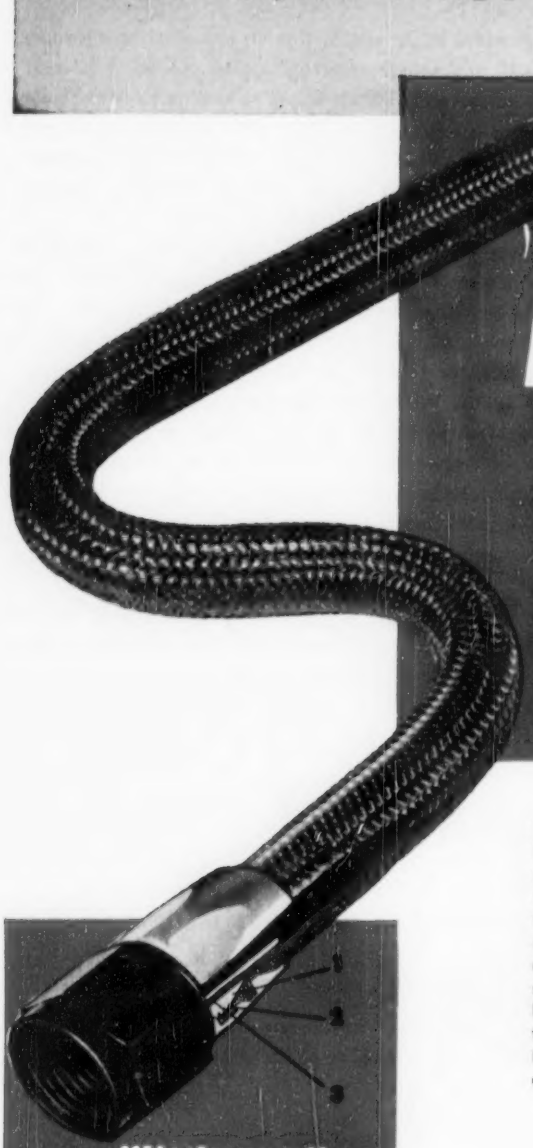
another aeroquip first! . . . HOSE LINES THAT CONVEY HOT AIR UP TO 500° F. *plus*



ANTI-ICING HOSE

and *"little gem"* fittings*

matched for guaranteed performance

*An Aeroquip Trade Mark

The aircraft industry asked for it . . . and Aeroquip was FIRST to develop hose lines that perform satisfactorily in jet engine anti-icing systems. Extremely flexible and light in weight, Aeroquip Anti-Icing Hose consists of a silicone inner tube and a braided stainless steel cover that adds strength and abrasion resistance. An important feature is Aeroquip's detachable, reusable *"little gem"* Fitting which was designed especially for this type hose. Only the reinforcing wire braid of the hose is clamped between nipple and socket thereby eliminating compression of the silicone inner tube. Positive, fluid-tight assembly is assured. Anti-Icing Hose Lines are suitable for other applications—your inquiry is welcomed.

"little gem" FITTING FEATURES

1. **KNIFE-LIKE SPUR** separates inner tube from reinforcing wire braid during assembly.
2. **CLAMPING ACTION** is exerted on reinforcing wire braid only.
3. **LIP SEAL** is formed as end of hose inner tube seats in annular chamber.

Aeroquip

REG. TRADE MARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

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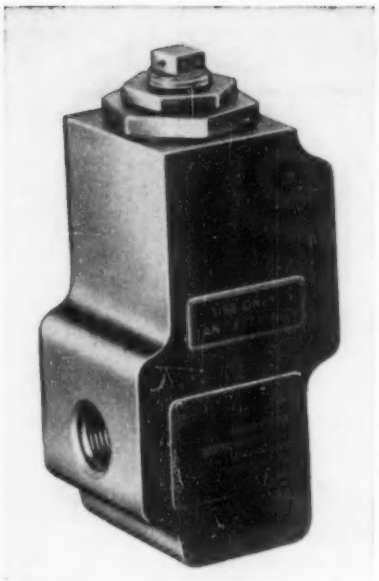
AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

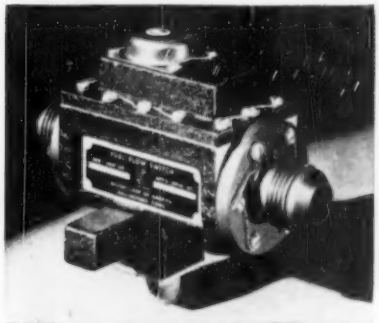


which projects the pressure adjusting screw.

Variations of the basic unit include a vented valve which permits external control. This unit has an opening in the bottom of the body connected directly to the reservoir through a solenoid valve or other control.

Another unit is the external drain valve. The drain isolates valve control oil flow from the main flow to reservoir, so that valve operation is not affected by back pressures that may occur in the return line.

Vickers Inc., 1400 Oakman Blvd., Detroit 32.



FUEL FLOW SWITCH

Flow switch for installation in aircraft fuel pump lines warns when fluid flow drops below predetermined value. Tiny, space-saving safety unit offsets vibration and accelerations by means of a balancing assembly. Operation also is said to be unaffected by pressure and temperature changes. If fuel flow falls off, calibrating magnets force a pivoted aluminum vane to the close-circuit position, actuating a hermetically sealed switch. This operates warning signal. Switch can be factory-adjusted to close at flow rate desired. Revere Corp. of America, Dept. 22, N. Colony St., Wallingford, Conn.

rugged

Under all conditions, the delicate mechanisms of Kollsman products must function with accuracy and rugged dependability.

- AIRCRAFT INSTRUMENTS AND CONTROLS
- OPTICAL PARTS AND DEVICES
- MINIATURE AC MOTORS
- RADIO COMMUNICATIONS AND NAVIGATION EQUIPMENT

Current production is largely destined for our defense forces; but our research facilities, our skills and talents, are available to scientists seeking solutions to instrumentation and control problems.

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or experience in

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Hughes Research and Development Laboratories, one of the nation's large electronic organizations, are now creating a number of new openings in an important phase of operations.

Here is what one of these positions offers you

OUR COMPANY
located in Southern California, is presently engaged in the development of advanced radar devices, electronic computers and guided missiles.

THESE NEW POSITIONS
are for men who will serve as technical advisors to the companies and government agencies purchasing Hughes equipment.

YOU WILL BE TRAINED
(at full pay) in our Laboratories for several months until you are thoroughly familiar with the equipment that you will later help the Services to understand and properly employ.

AFTER TRAINING
you may (1) remain with the Laboratories in Southern California in an instruction or administrative capacity, (2) become the Hughes representative at a company where our equipment is being installed, or (3) be the Hughes representative at a military base in this country—or overseas (single men only). Adequate traveling allowances are given, and married men keep their families with them at all times.

YOUR FUTURE
in the expanding electronics field will be enhanced by the all-around experience gained. As the employment of commercial electronic systems increases, you will find this training in the most advanced techniques extremely valuable.

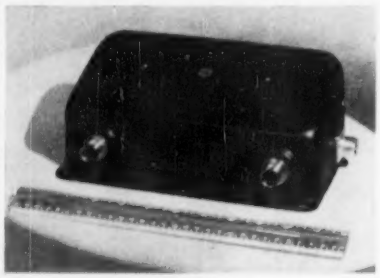
How to apply

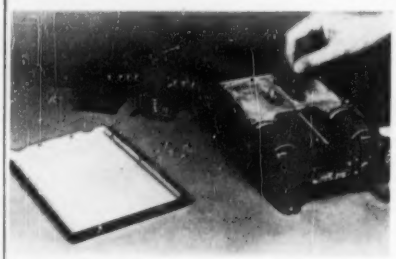
If you are under 35 years of age and have an E.E. or Physics degree and an interest or experience in radar or electronics,

write to **HUGHES**
RESEARCH AND DEVELOPMENT LABORATORIES
Scientific and Engineering Staff
Culver City, Los Angeles County, California

Assurance is required that the relocation of the applicant will not cause the disruption of an urgent military project.

NEW AVIATION PRODUCTS





GE Announces Two New Jet Ignitions

Two divisions of General Electric have announced development of jet ignitions, both designed to start jet engines at higher altitudes and speeds and at lower temperatures.

The new ignition systems may help permit full exploitation of more powerful engines designed for operation at higher altitudes, it has been indicated.

The parallel developments are the work of GE's Specialty Transformer and Ballast Dept., Ft. Wayne, Ind., and the company's Aeronautic and Ordnance Systems Division in Schenectady, N. Y. While differing somewhat in construction and approach, both equipments employ generally the same principles and produce similar results. Actually, the products may compete with each other for markets.

Development emphasis of the TBD is on a specific unit, while that of the AOS Division is on development of complete ignition systems. But the main element of both is the ignition exciter, and with the addition of sparkplugs and wiring, there is little else to a jet engine ignition system. Ignition exciters produced by both groups are the capacitor-discharge type, delivering energy at a constant rate virtually independent of altitude.

AOS says its systems are designed for use in small and large gas turbines, jet starters, rockets and ramjets, and are up to 50% lighter in weight than others currently in use. They employ GE's new miniature spark plugs and leads and provide constant spark energy at the plugs at all altitudes over a 2:1 range of input voltage.

As with the AOS equipment, the ignition exciter produced by STB will deliver rated energy to the plug when input voltages are reduced as much as 50%. This unit weighs 3 lb. 4 oz., said to be about 25% less than the unit it replaces. It reportedly has been approved for use in four production model jet engines. It is described as consisting mainly of a power source, a storage capacitor, an ionizing transformer and a "triggering" spark gap. It operates on 400c., 115v. a.c. current.

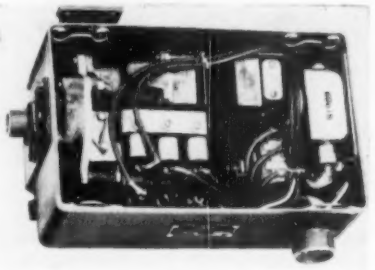
Explosion Chamber

Bowser Technical Refrigeration has developed an explosion chamber designed expressly for testing avionic equipment at simulated altitudes up to 70,000 ft.

The chamber, constructed to ASTM standards, permits wide latitude in electrical hook-up arrangements, including use of a.c. or d.c., high-frequency connections, and all types of coaxial cables. Also provided is access for various high-speed shafts and tuning shafts.

For safety, automatic fuel metering is used, intended to eliminate hazards associated with manual metering. A special ignition circuit permits firing the gaseous atmospheres at the high altitudes where the unit is designed to operate. Simulated altitude changes are achieved through use of a climb and dive valve. A viewing window permits observation of components under test.

Bowser Technical Refrigeration, Terryville, Conn.



Actuator Package

A standardized rotary actuator package, used to perform four jobs in the Lockheed F-94C, is readily applicable to other aircraft with minimum change, Electrical Engineering & Mfg. Corp. reports.

On the F-94C, one basic power box drives:

- **Aileron trim tab actuator.**

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Auto-Lite Silicone-insulated Wire is immediately available for use on civilian products — where extreme temperature ranges occur. Check these advantages of Auto-Lite Silicone-insulated Wire for both high- and low-voltage applications.

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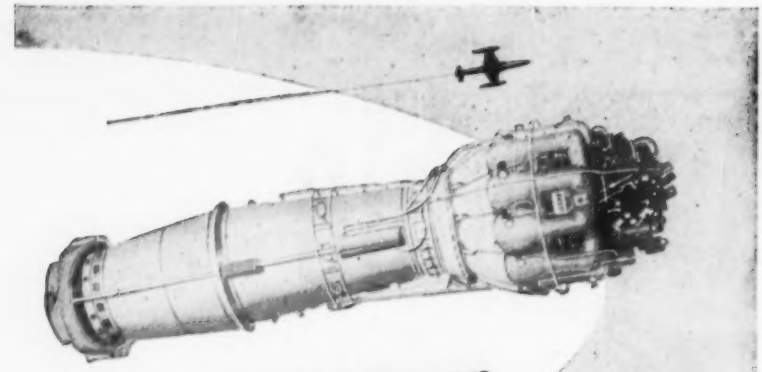

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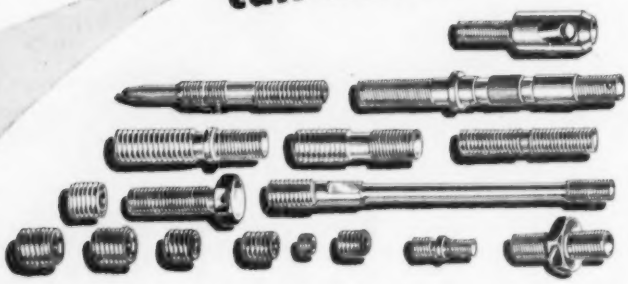

WHETHER FOR EXPERIMENTAL OR QUANTITY PRODUCTION, Ohio Electric can give you faster service on studs, bushings, inserts, or other parts made to the highest precision tolerances. A large volume supplier to major producers of jet engines and accessories, Ohio Electric is tooled and equipped to give you a better break on price and delivery on threaded parts made to "tenths." So reduce your lead time by turning your problems in hardened ground roll-threaded parts over to Ohio Electric. A call or letter will bring our representative on the double.

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Ohio Electric also makes lifting magnets and controls . . . fractional horsepower, shell and torque motors . . . heavy-duty electric hoists, and nail-making machines.

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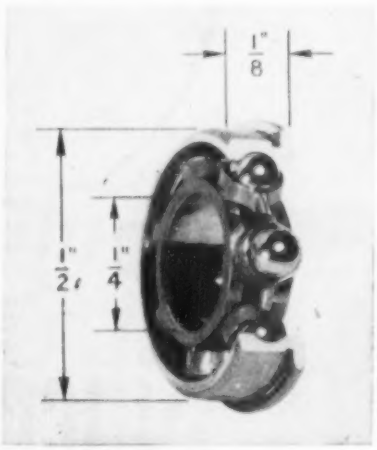
CHESTER BLAND
PRESIDENT

- **Elevator trim tab actuator.**
- **Aileron centering spring power unit.**
- **Elevator boost radio selector power unit.**

Differing requirements are met by slight variations in the power box and changes in motor windings, mounting bracket, drive and auxiliary gears and positioning cams.

The system, called the Universal Power Package, contains the motor, radio noise filter, magnetic clutch, brake and main reduction gear power takeoff. Where space is tight, flexible shafting is used, driving either linear or rotary actuators.

Electrical Engineering and Mfg., Corp., 4612 W. Jefferson Blvd., Los Angeles 16.



Instrument Bearing

A flanged instrument ball bearing, recommended for gimbals and other precision assemblies, has been added to the Micro line of New Hampshire Ball Bearings, Inc.

This model, FR188, is said to be of extra lightweight construction and features a straight, rather than tapered outside diameter. Produced to very high tolerances (ABEC Class 5 and higher), the bearing provides low and uniform running torque with quiet operation, according to the producer. It is made in all-stainless steel, as well as conventional SAE 52100 types.

New Hampshire Ball Bearings, Inc., Peterborough, N. H.

Fast-Stopping Motor

A space-saving aircraft motor for powering actuators and other military plane equipment at altitudes up to 50,000 ft. is being produced by the Aircraft Div. of U. S. Electrical Motors, Inc.

The ¼-hp. motor, an a.c., three-phase model, has a silent-type brake which stops it in 10 revolutions from a speed of 10,200 rpm. It is designed for in-

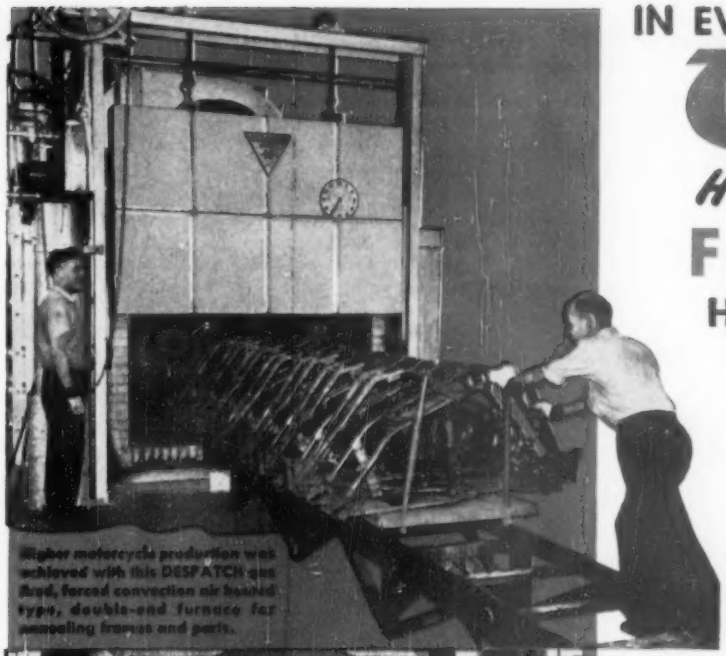
IN EVERY INSTANCE THESE

DESPATCH

HEAT TREATING

FURNACES

HAVE INCREASED PRODUCTION

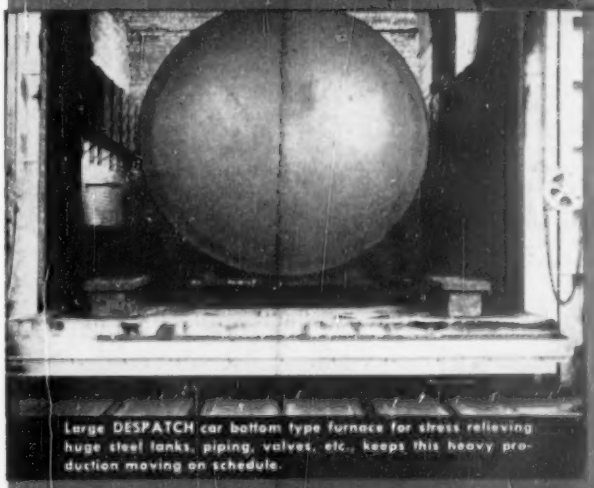


Higher motorcycle production was achieved with this DESPATCH gas fired, forced convection air heated type, double-end furnace for annealing frames and parts.

No matter what the industry may be, if there is a need for heat treating equipment DESPATCH can furnish it. DESPATCH Furnaces are engineered to fit the industries they serve, and to meet highest production standards in all tempering and drawing operations . . . solution heat treating and annealing of non-ferrous metals such as aluminum alloys, brass, copper and bronze . . . normalizing and stress relieving . . . aging processes . . . bluing of steel parts.

Dependable Performance Is Guaranteed with DESPATCH Furnaces. You'll find new design and construction features that give you better uniformity, greater flexibility, greater speed, positive accuracy, increased economies and proven dependability. The DESPATCH Furnaces pictured here, like hundreds of others on the nation's production lines, are daily bringing to pass the realization of the above advantages. In every instance they have increased production for the companies they serve.

Your Heat Treating Requirements Can Be Met with a DESPATCH Furnace because DESPATCH designs, builds and installs just what you need for your particular operation. There are batch and pot type furnaces, car bottom type, bottom entry quick-quench type for aluminum, conveyorized furnaces and all other material handling designs. Let DESPATCH engineers know about your heat treating problems. They can help you solve them. Write for full information to Dept. W.



Large DESPATCH car bottom type furnace for stress relieving huge steel tanks, piping, valves, etc., keeps this heavy production moving on schedule.

DESPATCH OVEN CO.

Minneapolis Office:
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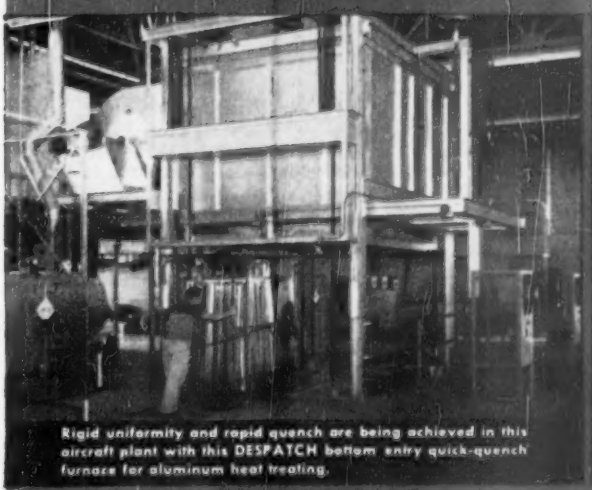
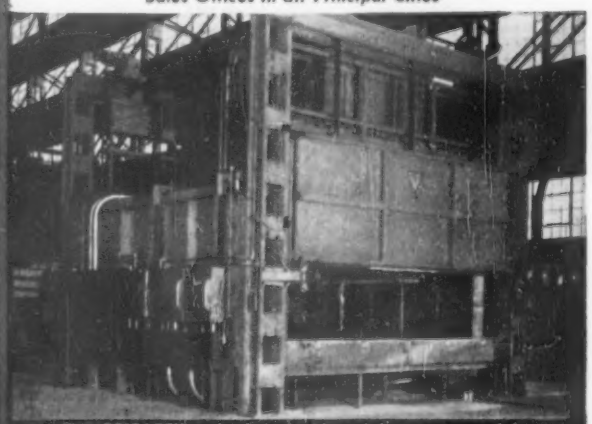
Chicago Office:
4554 N. Broadway

Sales Offices in all Principal Cities



Rigid uniformity and rapid quench are being achieved in this aircraft plant with this DESPATCH bottom entry quick-quench furnace for aluminum heat treating.



This DESPATCH carloader, double-end furnace is used for heat treating vehicle frames. Just now it is playing a doubly significant role in Defense Production.

PIONEERS IN ENGINEERING HEAT APPLICATIONS FOR INDUSTRY

termittent duty and reverse rotation, and is one of a series produced by the firm conforming with USAF Spec. 32590.

The motor has a splined takeoff shaft, AN mounting pad, pre-packed ball bearings, and features rapid acceleration and high starting torque. It is a fan-cooled, self-ventilating type.

Another unit recently put out by the firm is a 10-hp. model weighing 30 lb. for heavier jobs, such as operating pumps, compressors, hoists and the like in aircraft. This unit also conforms to USAF requirements.

U. S. Electrical Motors Inc., Aircraft Div., Box 2058, Los Angeles 54.

ALSO ON THE MARKET

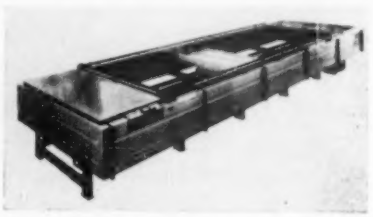
Routine drafting work is reduced with valuable savings in time and labor through use of Stanpat printed acetate sheets which have pressure-sensitive adhesive backing and can be applied directly to tracing; they reduce hand drawing of title blocks, bills of materials, standard components and sub-assemblies.–Stanpat Engineering Co., Whitestone, N. Y.

High voltage breakdown tester, Model P-7-20, supplies continuous a.c. or d.c., adjustable from 0-20,000 v., at low current drain; no damage occurs if short circuit current is maintained for long periods of time. Control cuts off power when load current exceeds any preset value from 5 to 20 milliamperes.–Industrial Instruments, Inc., 89 Commerce Rd., Cedar Grove, N. J.

Twist drill performance is improved through redesigned standard cemented carbide twist drill blanks, which permit more steel backing and greater strength at the point of the drill.–Carboloy Dept., General Electric Co., Detroit, Mich.

Mobile industrial X-ray unit designed for rapid field inspection of welds, aircraft equipment, powerplants and other apparatus, has high tension 150,000-v. output generator contained within the head of the X-ray tube. Entire assembly, complete with controls, weighs 223 lb., and is believed by maker to be the smallest and lightest on the market.–North American Philips Co., Inc., 750 S. Fulton Ave., Mount Vernon, N. Y.

Large vacuum frame meets aircraft industry demands by exactly reproducing drawn parts onto glass cloth, sheet metal, steel plate and other mediums, which may be cut out into templates



or serve as the structural part itself; also provides accurate duplicates of master drawings. Machine has variable speed light source which makes complete focal plane sweep for better light distribution.–Charles Bruning Co., Inc., 4700 Montrose Ave., Chicago 41, Ill.

Micro-Matic gauge for bar-stock cutting heads permits single operator to make more than 9,000 cuts hourly. He sets gauge for proper rod length and pushes material through cutting head. On contact with gauge surface, a solenoid closes cutter machine circuit, and the part is automatically cut and ejected. No foot or hand controls are used; the operator just feeds in the stock.–O'Neil-Irwin Mfg. Co., 516 Fifth Ave., Lake City, Minn.

Anti-spatter compound speeds welding by reducing clean-up time. Hot spatter striking the compound will not adhere to metal and is simply wiped off.–Thompson & Co., 1085 Alleghany Ave., Oakmont, Pa.

Facts and Figures!..

Figure:

Barbara Stinnett, as one can plainly see, is fully equipped for a frolicsome Fourth of July picnic in the country. In addition to bicycle and lunch, 19-year-old Barbara's holiday equipment includes grey eyes and dark brown hair, measures 5' 5½" in height and totals a choice 117 lbs.

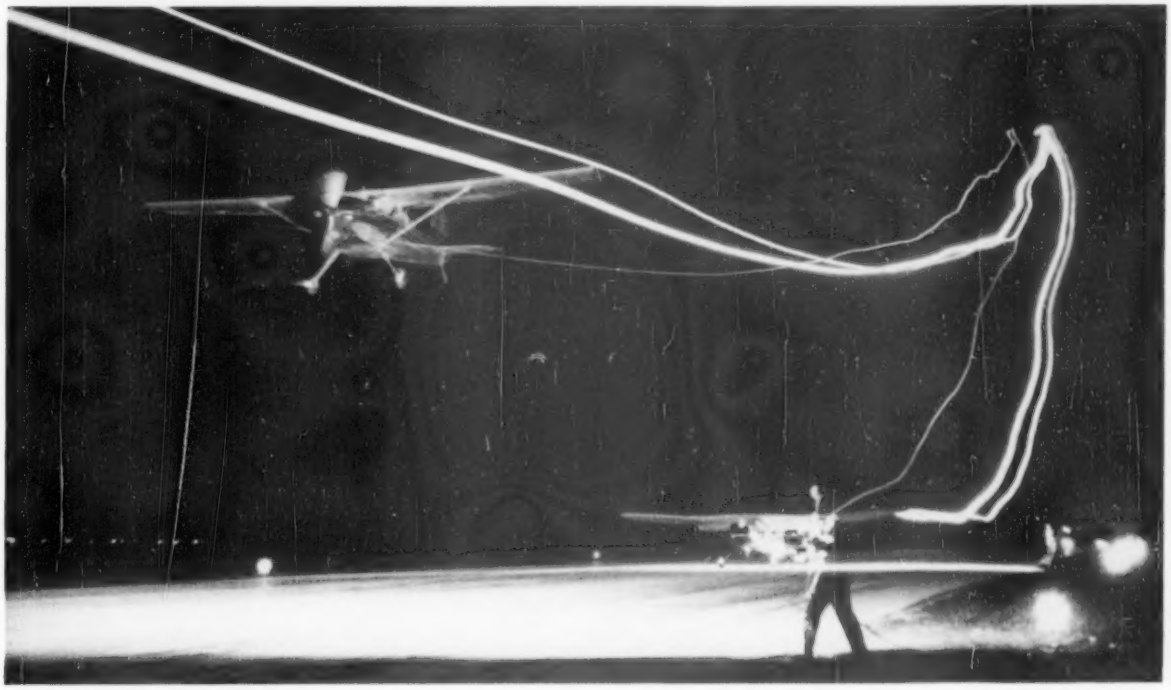
Fact:

Purchasing agents have a "picnic" equipping their companies and their aircraft from the complete, Famous Name stock inventoried and distributed by the Southwest Airmotive Company Sales Department. Courtesy, dependability, service, speed, and ABILITY TO PRODUCE combine to make this department the favorite with airlines and fixed base operators in every corner of SAC'S great territory.

Southwest Airmotive COMPANY
LOVE FIELD DALLAS

"Golden Year" Cessna 170

LOWEST-PRICED PLANE WITH SMALL FIELD FLAPS



Night Photo Shows How Cessna 170 Flaps Cut Landing Distance 50%

EXCLUSIVE "PARA-LIFT" FLAPS let your Cessna 170 descend more than twice as slowly as a man in a fully opened parachute!

THE 1953 CESSNA 170 features four-place comfort, 120 m.p.h. speed, all-metal luxury, a new heating-ventilating system that delivers 70% more heat, high-wing stability and visibility, a patented landing gear that smooths rough fields, and economy that matches automobile gas mileage.

Here is photographic proof of amazing Cessna performance with "Para-Lift" flaps! In the night photo above—a double exposure—you actually see the same Cessna 170 landing twice. *Without flaps*, the plane is still airborne (center of photo). But using *full-flaps*, the 170 descends immediately and touches down 2500 ft. shorter than its normal landing! White streaks were made by the plane's lights.

Cessna "Para-Lift" flaps reduce landing speeds more than 10%, permit small-field take-offs and landings, heretofore impossible—*and they're standard equipment on the Cessna* 170, America's largest-selling business airplane! See and fly the new "Golden Year" 170 at your Cessna dealers today! Also see the 150 M. P. H. Cessna 180 and Luxurious 5-Place Cessna 195.

FOR ADDITIONAL INFORMATION—Write Cessna on your company letterhead or mail coupon now.

Cessna 170

Cessna Aircraft Co.
Dept. AW-7
Wichita, Kansas

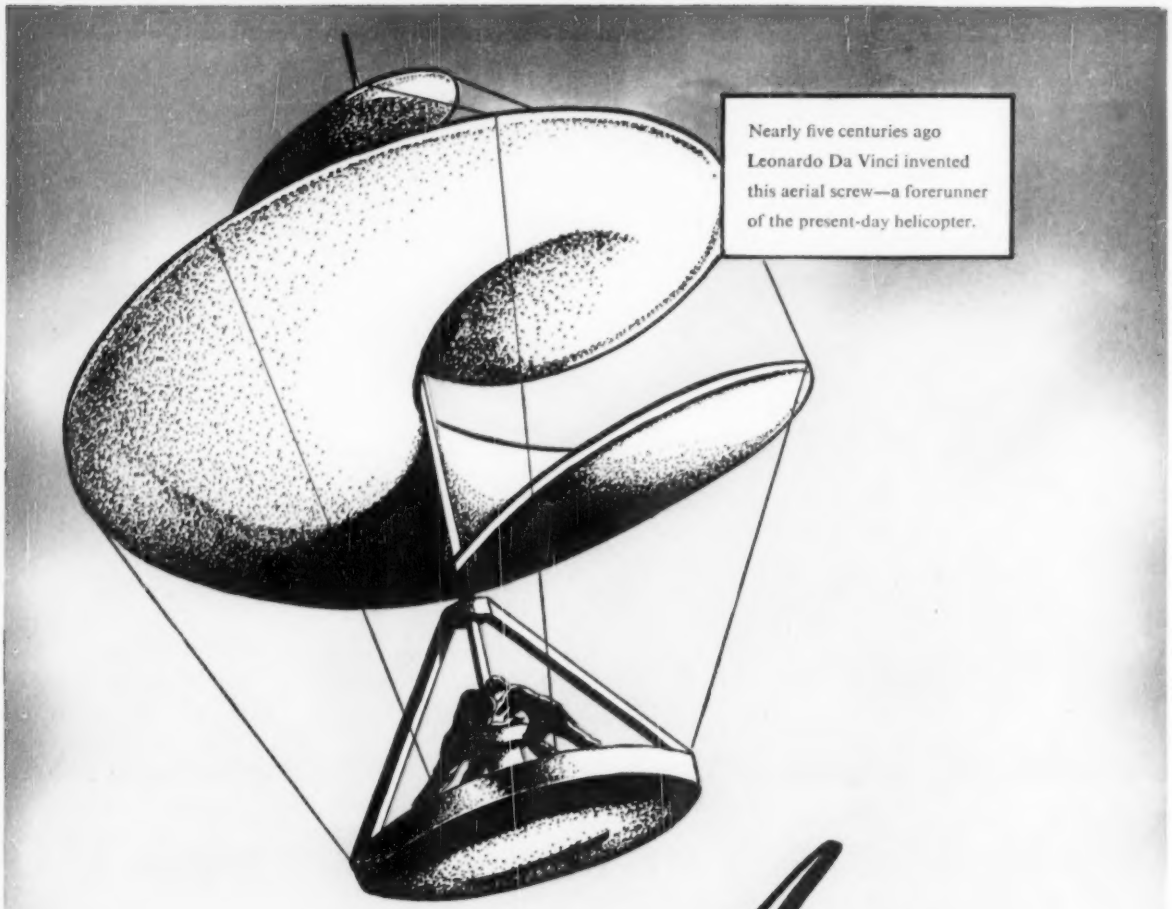
Please send information on the new "Golden Year" Cessna 170 ____, 180 ____, 195 ____

Name _____ Age _____

Address _____

City _____ County _____ State _____

(To insure prompt reply, please fill out coupon accurately)



Nearly five centuries ago Leonardo Da Vinci invented this aerial screw—a forerunner of the present-day helicopter.

... out of this came Aviation

...an industry with imagination

To serve this great industry there are many manufacturers with imagination and vision. Indiana Gear is such a company—a group of able craftsmen equipped with the best of tools and machines—producing the finest in precision parts. At I.G.W. we accept the challenge of this and all other precision industries. We will match their visionary design with creative production.

Indiana Gear fabricated this large steel ring gear for the main transmission of a recent model Sikorsky Helicopter without grinding and without heat treat distortion. Originally, the helical teeth on this gear were ground, but a necessary power increase overloaded the part and it failed.

It was assumed to be impossible to successfully heat treat the unground teeth, but I.G.W. produced the part without distortion and the gear operated successfully.

INDIANA GEAR

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Air Carriers Meet to Map Airmail Stand

- **Railroad plea for higher rate should boom plan for air shipment of mail, even if 7-cent price goes through.**
- **Postmaster General Summerfield wants to begin pilot tests soon of proposed bulk delivery by airfreight.**

Prospects for a boom in airline mail business looked bright last week despite Postmaster General Arthur Summerfield's proposal that Congress increase the price of airmail from 6 to 7 cents an ounce.

Cause for the boost to airmail prospects came from the railroad industry—which asked Interstate Commerce Commission for a 45% hike in rail mail rates.

This put more urgency than ever in the Postmaster General's long-considered plan to divert some longhaul railroad mail to air transport to save both time and money.

▶ **Invade Rail Market**—Airline cargo experts will meet this week to decide definite rates and routes to offer Post Office for the first experimental movements of bulk surface mail by airfreight. This rate discussion is slated to take place July 8 at a meeting of the Air Transport Assn.'s Cargo Advisory Board in Washington.

Summerfield's plan is to start a pilot test as soon as possible. Airlines would move bulk lots of mail each night on selected routes between major cities. This would give overnight mail delivery on many routes that previously required two days and more for delivery of surface-shipped mail.

Assistant Postmaster General John Allen is spark-plugging the plan in cooperation with ATA general counsel Stuart Tipton. Allen heads the Post Office Bureau of Transportation, disbursing an estimated $600 million a year for mail shipments.

▶ **7-Cent Fight**—ATA's Tipton told AVIATION WEEK the association had not yet decided whether to oppose the Postmaster General's request to Congress for an increase of 1 cent an ounce on straight airmail. He said the airlines definitely opposed an 8-cent rate but had not yet had time to study the new 7-cent proposal.

Because airlines get a fixed rate of airmail compensation from Post Office, any increase in price that the department charges the public tends to reduce volume and thereby cuts air carrier revenue.

Post Office Department's own cost-allocation data for 1952 show that its airmail service made a profit at the 6-cent rate after airline subsidy was transferred out of the PO budget. Airlines therefore argue against raising the already profitable airmail price to subsidize its loss operation on second- and third-class mail.

Washington observers expect Tipton to testify against the proposed 7-cent airmail rate proposed by Summerfield.

▶ **Legal Problems**—The program to ship surface mail by air went into high gear two weeks ago when the Post Office legal department reported it might require no new legislation (AVIATION WEEK June 15, p. 9).

Major legal obstacle appeared to be a clause in the Postal Revenue Act requiring that airmail should pay the Post Office 6 cents an ounce. But the legal interpretation placed on this by postal authorities is that Congress intended it as the price on an airmail stamp, with which the sender is guaranteed air transportation of his letter. This clause was not intended as a prohibition of dispatch of other mail by air when it is economical to do so, they believe.

Pertinent section of the postal rate revision enacted by Congress in 1948 states: "The rate of postage on all domestic airmail, as defined by Public Law 730 . . . shall, except in the case of postal cards and private mailing of post cards, be 6 cents for each ounce or fraction thereof." Definition of airmail referred to is that, "As used in this act, domestic airmail shall embrace all mailable matter being transported as mail by air. . . ."

▶ **Undercut Rates**—Postal officials and some airline executives are confident that the experimental shipment of surface mail by air on some routes will prove both a boon to Post Office service and efficiency and will boom airfreight revenues. Post Office plans to get Civil Aeronautics Board approval of ton-mile rates proposed for this experiment.

Proposed bill to allow the Post Office to contract its own rates with the carriers is an ultimate step—but is not a necessary one to give some success to the current plan to move a large volume of regular mail by air.

Some airline executives fear the shipment of regular mail at airfreight rates may undercut the premium airmail service and rates. But others point out that if the experimental program is successful, the volume increase would offset the possible loss of straight airmail revenues. They say success of the plan under CAB regulation would be their best protection against the ultimate Post Office Department proposal to bypass CAB rate-fixing authority.

▶ **Price Problem**—The big problem facing airlines is how to price this new service—air shipment of regular mail. They say they have been hampered by lack of postal data on expected volume, routes and degree of handling priority. Post Office is leaving it up to the air carriers to do the figuring and make an offer. The department says routes and volume will depend on the rates offered by the airlines.

The airlines' Air Cargo Advisory Board met two weeks ago to discuss rates to offer Post Office but found that

Copters for 20

Passenger helicopters will remain small, Clarence Belinn, president of Los Angeles Airways, predicts.

Belinn told a meeting of the Los Angeles Section of the American Helicopter Society that the size of the passenger helicopter has a practical limit if it is to retain its basic advantage of frequency of stops.

Very large copters for personnel are practical only for the military, Belinn says. He expects helicopter size to remain within the 16-20 passenger limit for scheduled passenger operations.

Most urgent need for passenger service is a good two-engine helicopter the size of a Lockheed Lodestar, the LAA executive says.

Belinn believes the helicopter has a definite place in the air transport system and will enable scheduled airlines to compete with all types of transportation in the shorthaul market, with an operational cost no higher than that of twin-engine conventional aircraft.

some air carriers had not studied the program enough yet to commit themselves to any rate structure.

The meeting this week is expected to find at least a tentative rate structure to offer Post Office for the experimental service.

Nonsked Fights CAB Restrictions in Court

North American Airlines last week challenged in two federal courts the Civil Aeronautics Board action to put nonsked air carriers out of business for violating present CAB regulations restricting their activities.

Federal District Court in Los Angeles blocked a Board enforcement proceeding against North American for 10 days while the district court in Washington was deciding whether to issue further restraining orders against CAB, pending judicial review. Decision is due today, July 6.

The large nonsked's nine affiliated companies make it the nation's fifth largest aircoach service (following Trans World, Eastern, American and United Air Lines, in that order).

North American contends CAB amendments to its original regulation have changed nonsked operating licenses without granting right of adjudicatory hearing.

Arguing on the same grounds two years ago, irregulars won court injunctions that still stand against one of those regulation amendments that would have cut nonskeds back to only three trips a month between big cities.

Court Says Airline Not Public Utility

A California court has ruled the State Public Utilities Commission cannot penalize United Air Lines for raising its aircoach rate two months before it was authorized to do so.

Citing a clause in the California Public Utilities Code that allows the commission to penalize a public utility in the name of the people, the PUC brought suit in the District Court of Appeals at San Francisco for penalty action agains United.

But Justice Fred B. Wood ruled that airlines are not public utilities.

This decision and previous rulings outline the California PUC's authority:

- It does have jurisdiction over airlines, by virtue of an article in the state constitution that allows the PUC to regulate transportation companies.
- The PUC can use its contempt powers, but this requires a previous order. If the airline overcharges, the utilities commission must order it to stop. If the company does not obey, fines up to $500 or jail sentences can be imposed. But even if the airline does comply, there is the problem of the time lag between the unauthorized rate hike and the order to cease overcharging, says J. Thomason Phelps, PUC senior counsel. The PUC cannot penalize the airline for overcharges during that period.
- The commission can order the airline to make reparation. The company must advertise that passengers who were overcharged can get refunds.

The present dispute on overcharges goes back to 1951, when three companies—United, Western, and California Central—raised their aircoach rates $1.75 two months before the PUC authorization for a rate increase was to become effective.

The case ended in the United States Supreme Court, where the airlines were ordered to make reparation and establish a reparation program to notify overcharged customers they could get refunds. However, only 1,280 of the 72,000 passengers claimed the extra charge, leaving the airlines with $124,280 in unrefunded overcharges.

So the PUC sought to penalize the firms and filed suits in the districts where their California headquarters are located—United in San Francisco and Western and California Central in Los Angeles.

The Los Angeles trial is now in progress, and the decision there might contradict the San Francisco ruling.

Meanwhile, the PUC is "considering" an appeal of the San Francisco decision to the California Supreme Court, according to Phelps.

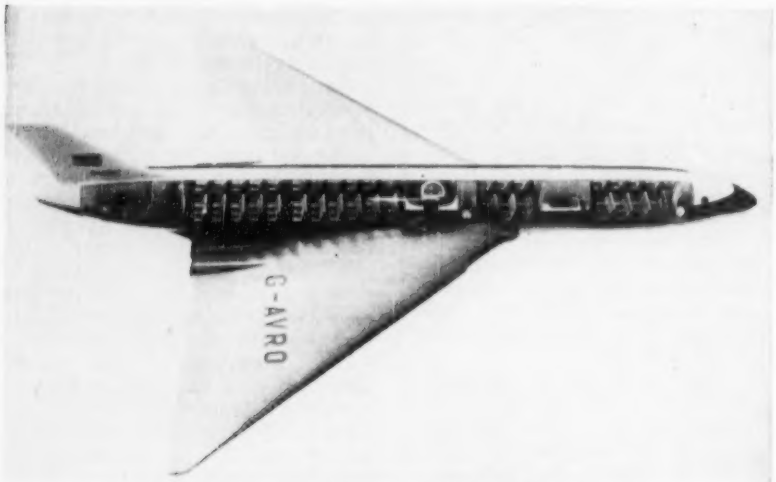
TWA Will Fight Airport Charges

Can municipal airports charge lower rates to customers who have leases? That question will go before the Federal District Court in San Francisco Aug. 24.

The San Francisco Public Utilities Commission says airports are public utilities and must charge the same rate to all customers for services such as the use of runways, lighting, etc.

Three airlines point to their San Francisco Airport leases and demand the lower rates set in the agreements. Those affected are:

- **Trans World Airlines,** whose 20-year lease began Oct. 1, 1942. TWA balked two years ago at the schedule of rates (identical for all customers) which PUC ordered the airport to adopt, and continued to pay the rates contained in the lease. Then TWA filed in Federal District Court a suit in declaratory relief, through which they could discover their rights under the contract. This is the case that goes before the court Aug. 24. The city, meanwhile, filed a cross-complaint, suing TWA for several thousand dollars—the discrepancy between the two rates over a two-year period.
- **United Air Lines,** which also ignored the airport's new schedule of rates and continued paying according to their 40-year lease. The PUC has advised the airline that it will sue for the remainder of the charges.
- **Pan American Airways,** who paid the higher rates under protest.



SECOND-GENERATION BRITISH JET LINER

Cutaway model shows seating arrangement and general configuration of new Avro Atlantic delta-wing jet transport, which is designed to cross the Atlantic in seven hours. Three versions have been planned, seating 76, 94 or 131 passengers. Note rearward facing seats in this model of the plane. Company's chairman, Sir Roy Dobson, says the new airliner could be delivered to customers in 1958 if they order immediately. Atlantic jet liner details were printed in Aviation Week June 22, p. 92.

PAR Contract

Civil Aeronautics Administration is expected to award contracts soon on $45,000 precision approach radar system at Oakland Municipal Airport, Calif. The work will be handled during good weather so that interference with aircraft handling will be minimized. The project includes new transmitter and generator buildings.

U. S. Lifting Capacity Tops Rest of World

American air carriers have a combined lifting capacity greater than all the rest of the world's airlines combined and today are transporting more overseas passengers than steamships do, the Aircraft Industries Assn. states. The claim is made in an AIA progress report on the airline industry for the period from passage of the Air Commerce Act by Congress in 1926.

U. S. air transports have carried 166 million passengers since then, more than the total population of this country, AIA notes. Last year, 1,269 airliners flew more than 27 million passengers more than 15.5 billion passenger-miles. In 1926, the carrier's fleet of 28 passenger planes had a total of 112 seats and a daily capacity of only 28,875 plane miles.

As passenger service went up fares have gone down, the association reports. In 1926 the average passenger fare was 12 cents a mile and today it is only 6.1 cents. Tourist flights are even lower. Airmail in the early days took 32 hr. to cross the country and cost 35 cents an ounce. Now it makes the trip in 10 hr. and the rate is 6 cents an ounce.

The Post Office Dept. believes that airmail traffic will go up to 53.7 billion pieces in 1954—equivalent to 329 pieces for every person in the U. S.

UAL DC-3 Loses Prop at Newark

Failure, during takeoff, of the nose casing that houses reduction gearing caused the left prop of a United Air Lines DC-3 to tear loose at Newark Airport, N. J., June 22.

The plane had just left the runway when the accident occurred and the pilot immediately set it down on the field without mishap. Only two passengers and a crew of three were aboard. No injuries were reported. The propeller did not strike the fuselage.

Preliminary investigation indicates that a support shaft worked its way out of the reduction gearing within the P&WA R1830 engine's nose casing and "milled the case webbing," causing the casing to break. The reduction gearing reportedly loosened allowing the forward section of the prop shaft and the prop to separate from the engine.

Japan to Build New International Airport

Osaka and Kobe, Japan, still are trying to find a site for their new international airport.

A report of the Transportation, Communications and Utilities Division of Commerce Department reveals the old Osaka Airport in the southern part ot the city, no longer in use, is too small and is hidden by industrial smoke most of the time.

Itami Airport outside Osaka, another possibility, is being used as an American base.

Kobe has proposed two sites between the two neighboring cities. One is in Amagasaki. There further land would have to be reclaimed from the sea. The second proposal is the airfield of the former Kawanishi plane works at Nishinomiza.

Whichever is chosen, Japanese observers say, it will be many months before work can begin on a new airport.

Soviet Increases Air Schedules

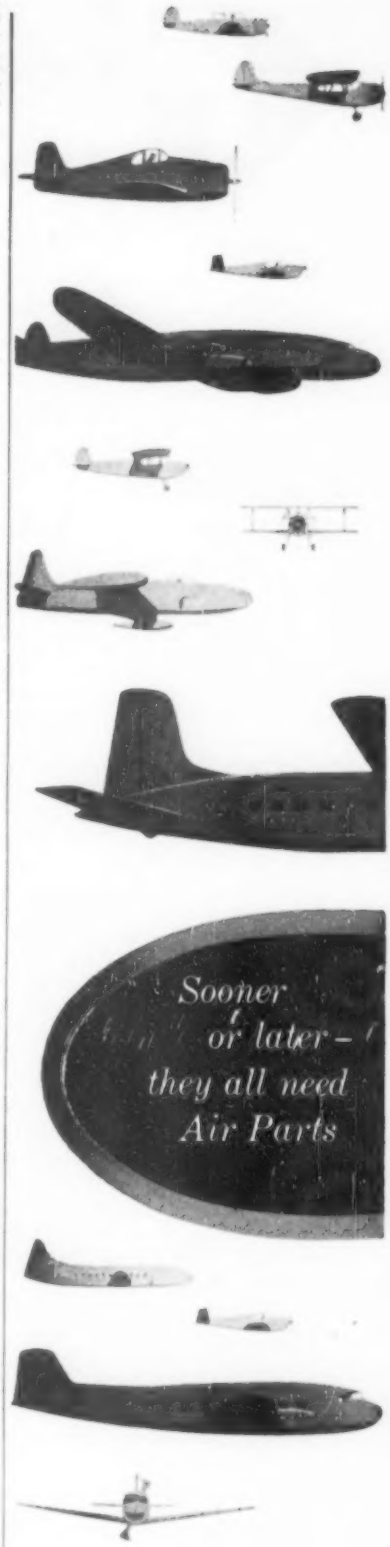
(McGraw-Hill World News)

New summer schedules have been put into effect on Russian domestic routes, stepping up the number of flights formerly handled, according to reports from the Soviet radio.

New services are being operated between Moscow, Leningrad, and Murmansk and between Leningrad and Chelyabinsk in the Southern Urals. New routes were inaugurated June 1 between Moscow and Khabarovsk (Far East), Mineralnye Vody (Northern Caucasus) and Vladivostok. Additional schedules are being flown between the Russian capital and Chita (Soviet Asia), Krasnoyarsk and Vladivostok, the Russian radio reports.

Hawaii Cuts Avgas Tax

The airlines have won a half-cent cut in Hawaii's 4-cent-per-gallon tax on aviation gas. At the 4-cent rate, the tax cost the carriers approximately $300 on each Stratocruiser flight from Hawaii to the West Coast and $168 on each DC-6. The carriers argued this was too high, considering that airlines were bringing far more business to Hawaii than had been anticipated.



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America's PIONEER Distributor
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Great Airlines from Little Airlines grow

and become GREAT assets to the commercial and military might of our Nation

CAPITAL AIRLINES of Washington is one of the finest examples of such dynamic development. For Capital began back in 1927 when its first independent parent company was formed, backed only by private capital and the determination to render a vital new service to the Nation and its citizens.

It was on April 26th of that year that Dewey Noyes made the historic first 'Capitaliner' flight in a single engine, open cockpit Waco biplane, carrying one sack of mail from Pittsburgh to Cleveland. In the spring of 1928 Clifford Ball, owner of the airline, purchased new Fairchild-71 cabin planes and later that year Pittsburgh Aviation Industries Corporation acquired ownership of the line. The following year Pittsburgh Aviation Industries Corporation bought Pennsylvania Airlines and subsequently operated under that name, until competition with Central Airlines resulted in a merger and the birth of Pennsylvania-Central Airlines. PCA, as the airline became commonly known, survived as the corporate name until 1948 when the present management took over and Capital Airlines came into being.

Capital Airlines was the first scheduled domestic carrier to recognize the potential of the aircoach market, initiating Nighthawk service in December of 1948 with one DC-4, New York, Pittsburgh, Detroit to Chicago. Since that milestone, the airline has increased aircoach mileage more than 800 per cent, from the original 1480 route miles to 12,586 miles daily.

Today, fifty years after the famous Wright Brothers' first flight, Capital Airlines has become the Nation's fifth largest domestic air carrier —serving 75 cities from Minneapolis to Atlanta, from New Orleans to New York.

Thus, on the golden anniversary of powered flight, NORTH AMERICAN AIRLINES, an independent carrier pioneering aircoach in today's tempo, congratulates Capital Airlines and its management for its contribution in the development and growth of the Nation's air transport industry under the American free enterprise system.

(Fifth in a series—"FOLLOWING THE TRAILS OF THE PIONEERS")

NORTH AMERICAN AIRLINES

First in Air Coach

CAB ORDERS

(June 18-24)

Southwest Airways was denied its request that it, instead of West Coast Airlines, be permitted to serve Klamath Falls, Ore.

Continental, Frontier and Pioneer Air Lines' Texas-New Mexico routes will be investigated with a view to deciding what carrier shall serve Raton, Socorro, Truth or Consequences, and Las Cruces, N. M. Continental's certificate expired this year, and the company asked CAB to renew it.

Lease restrictions on Super Constellations that Eastern Air Lines transfers to Northwest Orient Airlines at Chicago are slightly liberalized by CAB, but tight restrictions still prevent their offering anything like "through service" competitive with other carriers. Plane must stay an hour in Chicago, and can fly nonstop only to Seattle on Northwest's route. Complaints of Delta Air Lines were dismissed.

Interline contracts of Trans World Airlines, Piedmont and other carriers were approved.

Pan American World Airways director James S. Rockefeller's interlocking relationship as director of American-Hawaiian Steamship Co. was approved.

San Diego Harbor Commission was denied its petition to intervene in the West Coast-Hawaii route case.

Trans World Airlines was granted permission to fly a Wright Aeronautical Corp. technician on Super Constellations as an observer without charge.

Seaboard & Western Airlines was permitted to buy stock in Aviation Equipment Corp., which would buy planes and lease them back to S&WA. CAB examiner recommended approval, and the Board allowed his initial decision to become effective without further proceedings.

Riddle Airlines withdrew its application to give cargo service to the Virgin Islands, so CAB dismissed it.

North American Airlines was turned down again in its final plea for delay of the Board's enforcement case against the nonsked carrier.

American Airlines coach fares from Boston were suspended, because some tariffs called for first-class rates on shorthaul segments.

Pan American Latin American Division final mail rate was fixed at $26,980,000 for the back period Apr. 5, 1948, through Dec. 31, 1951 (AVIATION WEEK June 29, p. 63).

New York Airways was granted authority to fly passengers between Idlewild, La Guardia and Newark Airports starting this month.

Ozark Air Lines was refused an exemption to serve Bartlesville, Okla., on certain routes.

New route certificates were issued to American and Delta Air Lines pursuant to route modifications in the Central Air Lines renewal case.

Pacific Overseas Airlines withdrew from the Trans-Pacific and West Coast-Hawaii route cases; CAB dismissed the application.

North Central Airlines mail rate was set by CAB.

West Coast Airlines was granted a tem-

FSF Safety Awards

Flight Safety Foundation issued awards to 42 airlines for their 1952 records. Almost all the eligible (scheduled) airlines qualified for the award.

These were the award criteria:

- No fatalities in 1952.
- Two billion safe passenger-miles since the last fatality.

Best five safety records on a recent-safe-passenger-mile basis, as of Dec. 31, 1952; Eastern, 5,143,875,000; Trans World, 4,975,033,000; American, 4,821,404,000; United, 3,182,144,000 and Braniff, 2,440,007,000.

porary mail rate increase, pending settlement of Post Office objections to $1,614,528 final annual pay recently proposed by CAB. The Board has reduced that by $25,800 in the new temporary rate as a margin to guard against overpayment, but it still is substantially more than West Coast's former temporary rate.

Piedmont Aviation was permitted to omit service of more than one flight a day to Beckley, W. Va.

Lake Placid Airways' request to call itself Lake Placid Air Service was dismissed, because the company failed to go through proper channels in its application.

Lake Central Airlines director J. D. Peterson's interlocking relationship as director of two railroads and a telephone company was approved.

Ozark Airlines renewal case was consolidated with various city and airline route applications in the general Ozark area.

Japanese Airlines Boost Capitalization

The Japanese air transport picture is brightening with expansion of two carriers, Japan Air Lines and Far Eastern Airline Co.

JAL—operating out of Tokyo—is being reorganized by seven-man committee appointed by the Japanese Ministry of Transportation.

▶ **Million-Dollar Program**—Present 400-million yen (approximately $1,111,111) capitalization will be increased to 2-billion yen ($5,555,555), a report of the Transportation, Communications and Utilities Division, Commerce Department, reveals.

The airline itself will provide 400 million yen; O.S.K. and Iino steamship lines have agreed to contribute 100-million yen each. Japanese government will provide the remaining 1-billion yen. Seijiro Yanagida will remain president of the carrier.

A domestic airline, JAL looks forward to international routes as soon as current aircraft orders are filled. The airline has ordered three DC-6Bs, two Comets and three Herons to supplement its present fleet of six DC-4s, two Beech 18s and one Beech 2.

▶ **Nonsked to Regular**—Far Eastern Airline Co.—nonsked flying out of Osaka, Japan—hopes to expand its present 50-million yen ($138,889) capital to 200 million yen ($555,556) by July. One-third is to be provided by shareholders, the remainder subscribed by the general public.

The carrier expects to receive a license to operate regular service between Osaka, Shikoku and North Kyushu by October.

It recently received a license to operate irregularly.

The airline operates from Hanshin Airport by permission of the U. S. Air Force which controls Hanshin as a standby field. The carrier is equipped with two de Havilland Doves and four Auster Autocars.

New Airline May Fly Honolulu-Tahiti Route

A new airline soon may develop remote Tahiti island in the South Seas into a tourist spot. South Pacific Air Lines has won fixed recommendation from Civil Aeronautics Board examiner Barron Fredricks for certification to give direct Honolulu-Tahiti service with two four-engine Solent flying boats.

No other airline has tried the route on a regular basis.

Dollar Associates, subsidiary of Robert Dollar Co., will own 75% of the new carrier.

SPAL president is M. S. Van Burkleo, former Air Force flier with postwar nonsked and Tokyo airlift experience. Operations vice president is B. M. Monkton, ex-RAF pilot and postwar founder of Trans-Oceanic Airways, Australian flying boat operator.

▶ **Tourist Lures**—Examiner Fredricks forecasts success for the non-subsidized venture because of the apparent soundness of the financial plan and what he terms the "scenic and recreational lure" of Tahiti.

"Existing means of transportation to Tahiti are unsatisfactory," Fredricks says. "The only service is provided, at long intervals, by freighters, none of which carries more than 12 passengers." Elapsed time of occasional air service from Honolulu, "assuming that all (three) connections are made," is 40 to 70 hr. at roundtrip cost of approximately $1,000.

▶ **Speedy Approval**—South Pacific will fly its British Solent four-engine, 40-passenger flying boats on one roundtrip per week, taking 14 to 17 hr. Roundtrip fare will be $532.

The carrier told Fredricks it anticipated an average of 31 passengers a

AIR-PARTS INC.
723 Sonora Ave., Glendale 1, Calif.
New York • Washington, D.C. • Oakland

week to and from Tahiti, including natives and tourists.

South Pacific already has CAB permission to start operating on a temporary exemption, and outlook is for speedy approval of the carrier's certificate. No airlines protested SPAL's application for certification.

ACC on Air Radar: Yes, But Which?

The airline-government committee studying anti-collision warning systems finds a need for such devices but has not agreed on what radar to recommend for airline use.

Special Working Group No. 10 of the Air Coordinating Committee submitted its report on four major systems to the navigation panel of ACC, but the panel sent it back for more study on what device to choose.

▶ **Airline Need**—The committee found a definite "need" for some kind of anti-collision system on new airliners, according to a brief of the report by committee member Dean Phillips, Trans World Airlines, published in the Air Line Pilot.

"It was the opinion of the committee," he reported, "that all the terrain collisions but one or two (of the 25 studied) could have been prevented if the pilot had heeded the warning of a reliable terrain warning device."

The major systems analyzed:

• **Search radar** to be used primarily for storm detection but also for terrain warning and general navigation. Main interest of airlines centers now on the evaluation by United Air Lines of an RCA development—the first radar developed expressly to airline requirements.

• **Radar altimeter** that signals height above terrain. The committee found "promise" in the APN 22 developed by Raytheon for the Navy.

• **VOR-DME position location**, giving proper map orientation to avoid collision with terrain. Hazeltine Electronics Corp. and Federal Telecommunications Laboratory were most active in the original civilian development of distance measuring equipment (DME) for Civil Aeronautics Administration.

• **Airport surveillance radar**, which can show the ground operator when a plane in the control area is approaching a potential collision. Gilfillan Bros., Inc., Bendix Radio and General Electric are contractors on CAA surveillance radar.

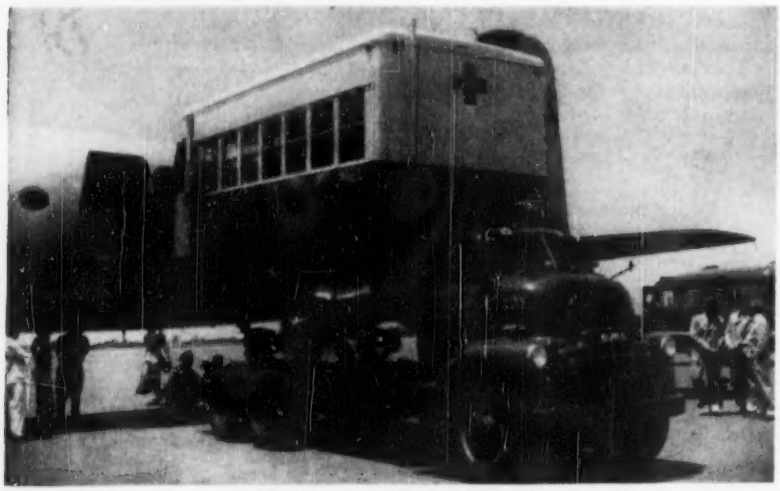
▶ **Simple Aid**—Many other devices and techniques tie in with proper terrain clearance protection. All were studied.

A relatively simple aid that appealed to pilots on the committee is an improved chart holder developed by Jepsen Co. in cooperation with Larry Shapiro of United. Jepsen will market this as the "Jepco Reference Holder." It fits on the edge of the glare shield and folds out of view.

Jepsen is designing special-chart series to fit. Pilot can flip from his enroute map, then to terminal area and finally to approach maps, an airline official reports.

He says it will make "the difference between a sloppy operation and a clean one" on navigation.

(For one airline pilot's view of the problem of air collisions between planes, see Capt. R. C. Robson's Cockpit Viewpoint on p. 92.)



NEW LIFT FOR WOUNDED

Novel 16-litter hydraulic-lift ambulance of Military Air Transport Service demonstrates how patients can be loaded directly into a hospital plane without exposing them to inclement weather. Body of the General Motors truck can be lifted to 13 ft.

Canada Rejects CPA Freight Plea

The Canadian government has rejected Canadian Pacific Airlines' application for an airfreight franchise covering service from Toronto and Montreal to Vancouver, a reliable Canadian source reports.

CPA has been trying to break the transcontinental monopoly held by the government-owned Trans-Canada Air Lines, but the government maintains there is insufficient business for transcontinental competition.

Sabena Gets First Copter

Sabena Belgian Airlines' first eight-passenger Sikorsky S-55 helicopter is en route to Belgium by ship and is scheduled to inaugurate Brussels-Antwerp-Rotterdam service Aug. 3.

Sabena expects to build its tri-city copter service to three trips a day, plus two daily flights between Brussels and Lille, France. Capacity will vary from five to eight passengers.

SHORTLINES

▶ **British Commonwealth Pacific Airlines** is converting five DC-6s with side-by-side sleeper arrangement with window and aisle lower bunks separated by a curtain. Planes will carry 24 persons in lowers, 13 in uppers. BCPA operates Canada-Australia-New Zealand. . . . Company has reorganized management under commercial finance director I. O. Lawson and operations director J. W. Bennett.

▶ **Capital and National Airlines** have extended their interchange to include Buffalo, N. Y., service direct to Miami via Pittsburgh and Washington.

▶ **Civil Aeronautics Board** has renewed approval of airline agreement providing a 10% discount to defense agencies. CAB member Josh Lee dissented, as previously, on grounds discount discriminates in favor of the military.

▶ **Delta-C&S Air Lines** has ordered six more DC-7s, making 10 slated for delivery by the end of next year. American has 25 DC-7s on order, United 25 and National 4. . . . Delta plans a Constellation aircoach service New Orleans-Chicago starting about Aug. 1.

▶ **KLM Royal Dutch Airlines** offers tourists "rain insurance"—a program originated by the Tourist Development Assn. of Arnhem, Holland. Policy costs 33 cents per $2.64 of payoff. It pays off

More Tourists to Hawaii

Tourist travel to Hawaii is zooming and three-fourths of it is by air. The islands expect close to 70,000 tourists this year, compared to 60,000 last year and only half that in the biggest year before World War II.

Pan American World Airways reported 1,791 bookings on its California-Hawaii routes during June 11-14, the heaviest passenger bookings in its history on the route.

Part of the gain is due to tourist flights started Dec. 1. On June 1, PAA increased from six tourist roundtrips a week between Hawaii and California to nine. Fare: $225 plus tax.

when more than one-eighth inch of rain falls on the day insured. Policy must be bought a week or more in advance.

▶ **Lake Central Airlines** says expansion plans were completed last week under the CAB program of Feb. 28, starting service to Marion, Ohio, and Kokomo, Ind.

▶ **Northeast Airlines** president George Gardner reports that the Delta-Northeast merger agreement is in effect "dead." CAB shelved the application three years ago, because it was contingent on Delta route extension to New York. CAB examiner, in recommending approval of Colonial-Eastern Air Lines merger, also suggested a Northeast-National merger.

▶ **Northwest Orient Airlines** 76,615,488 passenger-miles in May set an all-time high for the spring season and were up 31% from a year ago.

▶ **Pan American World Airways** has furloughed 80 low-seniority co-pilots "not currently required due to conditions beyond the company's control." Major reason was CAB's withholding of $10-million mail pay from the Latin American Div. for "over-scheduling" and over-equipping. Approximately $5 million of disallowed capital expense can be recaptured later as business grows to fleet size, but the other $5 million came directly out of profits.

▶ **Trans World Airlines** has topped 10-million passenger-miles in a single day of operation. . . . May traffic gained 32% from a year ago.

▶ **United Air Lines** plea for nonstop rights on points east and west of Salt Lake City is denied in the initial decision of CAB examiner F. D. Moran.

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P-8352, Aviation Week
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ASSIGNMENT — you will assist in the installation, operation, and maintenance of our equipment at aircraft plants and Air Force bases. The work will include liaison between AC and the customer, training of customer personnel, analysis of problems, and recommendations for improvements. In these positions you'll gain invaluable experience in all phases of both engineering and manufacturing.

YOUR BACKGROUND — your educational background can be in any of the fields of AE, EE, ME, Physics, or equivalent. To be successful in these positions you should have a definite interest in people as individuals and be willing to relocate to field assignments. Married men on regular assignment have their families with them.

TRAINING — regardless of your background, our theoretical and applied in-plant training (here in Milwaukee) will prepare you for these assignments.

In addition to your salary, you will receive a field allowance — and a substantial bonus if selected for overseas assignment . . . If you're looking for an opportunity with a "present" and a future write us for further facts.

We need men of high caliber, experienced in the field of airborne automatic electro-mechanical control equipment. You will be engaged in the manufacture and development of highly complex equipment of the most advanced type in a steadily expanding division of our company—a division with 20 years of successful operation in the precision instrument field. We offer many advantages to those who join our organization—
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You work better in Lockheed's atmosphere of progressive thinking – and you live better in Southern California. You enjoy life to the full in a climate beyond compare, in an area unequalled for opportunities for recreation and outdoor living.

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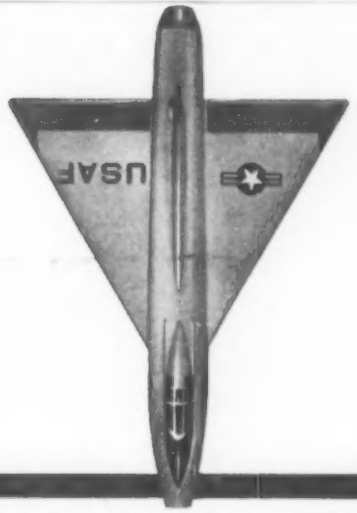

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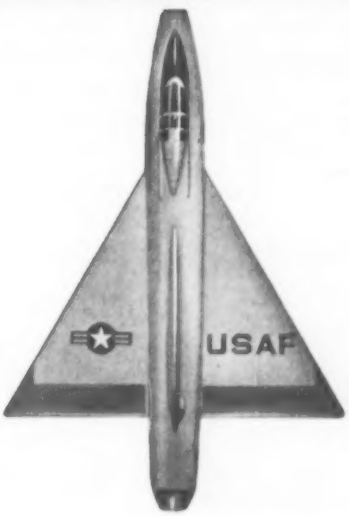

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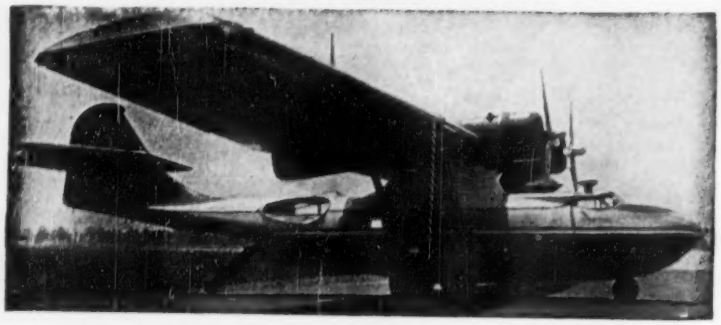

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62	CQ-9	Eclipse	Clutch Switch (PB10)
11	13086-1C	Eclipse	Amplifier
19	15100-1B-A1	Eclipse	Pitch Trim Gauge
8	20000-43A-13A1	Eclipse	Magnesyn Transmitter
67	23000-2A	Eclipse	Magnesyn Indicator
15	22101-11-A4	Eclipse	Pressure Trans.
6	2226-11C-3A	Eclipse	Dual Tach.
9	20100-42B-14A2	Eclipse	Torque Ind.
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23	20100-11C-4-A1	Eclipse	Wing Flap Indicator
11	DW-33	Eclipse	Transformer
23	CQ-2	Eclipse	Switch Box
75	1195-4-A	Eclipse	Vibrator
80	DW-28	Eclipse	Transformer
11	2227-11-D3A	Eclipse	Tachometer
75	1416-12E	Eclipse	Starter
100	716-3A	Eclipse	Generator (NEA-3A)
384	564-2A	Eclipse	Oil Separator
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40	119862	Weston	Carb. Air Temp. Indicator
400	AN5780-2	Weston	Wheel & Flap Position Indicator
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11	727TY70Z2	Weston	Air Temp. Ind.
85	727TY72Z2	Weston	Air Temp. Gauge
88	727TY73Z2	Weston	Air Temp. Gauge
83	727TY74Z2	Weston	Air Temp. Gauge
10	728-40Z2	Weston	Air Temp. Gauge
21	8DJ99AAY	G.E.	Cowl Flap Ind.
22	77C5	Lewis	Carb. Air Temp.
16	76B19	Lewis	Cyl. Head Temp.
23	77C3	Lewis	Oil Temp. Gauge
13	77C4	Lewis	Oil Temp. Ind.
30	47B21	Lewis	Free Air Temp.
33	47B22	Lewis	Air Temp. Gauge
28	47B23	Lewis	Air Temp. Gauge
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33	DW-47	Eclipse	Transformer
46	117-47	Edison	Fire Detector
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43	966090	Kidde	Interconnector
104	966679	Kidde	Pressure Control
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151	A-4614	Kidde	Switch
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74	923748	Kidde	Oxygen Cyl.
326	982585	Kidde	Valve
325	AN60009-1B	Oh. Chem.	Valve
247	AN6009-2A	Oh. Chem.	Valve
47	9-1046-76	Parker	Valve (3000 PSI)
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105	SP4-2746-78	Parker	Restrictor Valve
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123	PI2-2546-76	Parker	Cone Check Valve
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Who Hit Whom?

Much ado was started early this spring when an aviation organization put out a press release blaming airline pilots for every mid-air collision between lightplanes and transports. That this statement was pure poppycock is evident to anyone who reads the CAB reports. Motivation for the statement apparently stemmed from a publicity need during the annual membership drive.

But putting the blame is no help—everyone probably deserves a share—the question is how do we avoid these things. Few greater challenges have ever been presented to aviation than that of the mid-air collision. No cure-all exists, that much is certain. But the constant increase in flying and in speeds worsens the odds every day, so all possible steps should be taken towards prevention.

▶ **Collision Course**—There is a popular misconception that a slow airplane cannot overtake, and be at fault, in a collision with a faster one. Not so. A collision course may be established between any two moving objects merely by arranging speed, distance and direction so that there is a common focal point. By use of a pencil-and-paper diagram and reference to the CAR "rules of the road" it can be seen that either object can be the overtaking one, the aggressor, so to speak.

Now considerable importance has been attached to maintaining a constant watch through the windshields as a means of avoiding collisions. And no doubt this plays an important part. But pilots can see only a small fragment of space and several collisions have occurred because opposing planes remained in each other's blind spots. So the naked eyeball is not the only answer.

Further substantiating this is the fact that most collisions have occurred during periods of good visibility. There was a get-together because the planes were not aware of each others' presence. (Whether good visibility participants COULD have seen each other is conjecture, but they didn't.)

Can it be that traffic clearances, as adhered to under instrument conditions, work better than the human eye?

Rarely has there been trouble when adequate communications (with the resultant position reporting) allowed pilots to know of each other's whereabouts. Despite this, it is surprising the number of planes found proceeding blissfully through control zones without so much as saying hello on the radio. Or, another frequent occurrence, aircraft intending to land arrive over an airport without any prior notice of intent.

▶ **Terminal Hazards**—The terminal area is, of course, the place of greatest hazard. Spotting traffic over metropolitan centers is one of the hardest jobs a pilot has—even when he knows where to look.

The hue and cry about anti-noise, the resulting altitude restrictions, pressurized aircraft, all these mean that air carriers—and others—are making more high approaches and steep descents than ever before. Picking out small airplanes below becomes nearly an impossibility at times. When we throw in the cockpit duties, small windshield area, etc., visual detection becomes only a so-so solution.

Airway acrobats, wrong-altitude Willys, Sunday drivers and many other types all add to the confusion. And, to misquote a lie, "Hardly a pilot is now alive who occasionally for his three miles does not strive." And these thoughts are not meant as alibis or as criticism of any particular group. They are just the facts of aviation life.

Since collision is apparently here to stay, we will have to do the best with what we have. Strict adherence to the rules of the road, maintaining adequate communications, accurate position reporting and a sharp lookout will help. In fact they will have to. What else have we got?

AVIATION CALENDAR

July 7-16—20th national soaring contest, Harris Hill, Elmira, N. Y. Categories include: men's national, women's national, championship club and A, B and C.

July 9-12—Sixth International Aviation Exposition, Detroit-Wayne Major Airport.

July 15-16—IAS Annual Summer Meeting, Honors Dinner, IAS Building, Los Angeles, Calif.

July 18-19—Air review commemorating 50th anniversary of powered flight and 25th anniversary of Eastern Air Lines, Akron-Canton (Ohio) Airport.

July 27-Aug. 2—1953 model airplane championship, U. S. Naval Air Station, Willow Grove, Pa.

Aug. 2—Amarillo, Tex., Jaycee Air Fair, observance of 50th anniversary of powered flight, Tradewind Airport.

Aug. 3-8—Fourth annual congress, International Astronomical Federation, Zurich.

Aug. 19-21—Western Electronic Show and Convention, San Francisco.

Aug. 19-24—Seventh International Model Plane Contest, sponsored by Plymouth Motor Corp., at Selfridge AFB and Belle Isle, Detroit.

Aug. 25—Ninth legal committee session, International Civil Aviation Organization, Rio de Janeiro. Meeting will study and revise a draft intended to replace or amend the Warsaw Convention international air law.

Sept. 5-7—National Aircraft Show and 50th anniversary of powered flight, Dayton (Ohio) Municipal Airport.

Sept. 7-13—1953 SBAC Coronation Year Flying Display, Farnborough, Hampshire.

Sept. 7-17—Fourth International Aeronautical Conference, joint meeting of RAeS and IAS, London.

Sept. 9-11—Air safety seminar of Flight Safety Foundation. Probable location: Luxembourg.

Sept. 21-25—Eighth National Instrument Exhibit, Instrument Society of America, Sherman Hotel, Chicago.

Sept. 23-24—1953 meeting of Aircraft Spark Plug and Ignition Conference, Champion Spark Plug Co., Toledo.

Sept. 28-30—Ninth annual meeting, National Electronics Conference, Hotel Sherman, Chicago.

Sept. 29-Oct. 3—National Aeronautics Meeting, Aircraft Engineering Display and Aircraft Production Forum of the Society of Automotive Engineers, Hotel Statler, Los Angeles.

Sept. 30-Oct. 1—Aircraft electric equipment conference, American Institute of Electrical Engineers, Seattle.

Oct. 10—England-Christchurch (New Zealand) air race, with speed and transport handicap sections.

Oct. 10-17—Fifth annual all-Texas air tour, sponsored by Texas Aeronautics Commission, Austin.

Oct. 14-15—Annual airport development and operation conference, sponsored by New York Department of Commerce, Onondaga Hotel, Syracuse, N. Y.

Oct. 28-30—Annual convention of Southeastern Airport Managers' Assn., Marlin Beach Hotel, Ft. Lauderdale, Fla.

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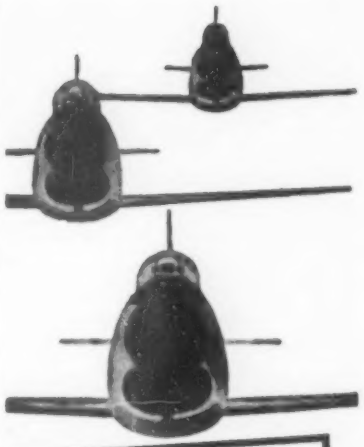

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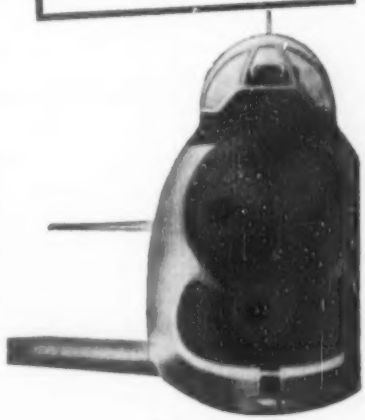

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NORTH AMERICAN HAS BUILT MORE AIRPLANES THAN ANY OTHER COMPANY IN THE WORLD

EDITORIAL

Imaginative Selling Pays Off

How are those United Air Lines commuter flights for men only panning out? The answer is fine—with a higher load factor than the rest of the system.

Many an executive eyebrow went up in the airline business when this traditionally conservative carrier announced last spring that it was setting up the first daily service exclusively for male patronage in the history of commercial aviation.

Late in the afternoon of each business day a 52-passenger DC-6 leaves from each terminus of the Chicago-New York airway, with two stewardesses as the only femininity aboard. There are slippers and market reports available and there are no rules against pipe smoking.

Load factor is averaging better than 85%, with the trend upward. United says it's the most popular feature anyone there can remember since the family plan was introduced.

Even with all of its inherent advantages, air transportation—like most other businesses—can be improved by imaginative selling. United is proving it.

Courageous Decision

The sudden decision of Air Force Secretary Harold Talbott to cancel the Kaiser contract for C-119 cargo planes was courageous and forthright.

Unit costs long since had risen far beyond the original estimates of approximately $467,000 to recently announced expenditures averaging $1,339,140. There were indications that the ultimate cost would have approached $1,500,000.

Kaiser's contract for turning out the new Chase C-123 cargo transport was also canceled. It is understood that the Army has acted swiftly in informing the Air Force that this plane should be built. If it is determined to be a defense need, and if an economical and efficient producer can be found, it would appear that this work should be permitted to continue.

'Where Are They Coming From?'

Every summer we run into several airline executives who, goggle-eyed from their most recent glimpse at the passenger traffic statistics, blurt out, "Business is terrific. We don't know where all these people are coming from."

For years, it has been our contention that the airlines have underestimated their potentials. Twice last year their trade association was compelled to revise its 1952 traffic forecasts upward. This promises to be another record-breaking year, with the Air Transport Assn. reporting revenue passenger miles up by about 23% over the first six months of last year—which also was a record-breaker. This gain of at least 20% is expected to hold for all of 1953, it appears now.

For many months, several years back, AVIATION WEEK conducted an editorial campaign on behalf of aircoach transportation. The bitterness aroused in the industry by the editorial series was surpassed only by the variety of alibis put forth for keeping flying a luxury service, contrary to the history of every other mode of transport.

The tide has turned, however. Today—for example—Trans World Airlines is operating more transcontinental aircoach flights each day than first-class schedules. The coach business generally is booming—despite the fact that the nonscheduled carriers, who introduced aircoach in the U. S., are still operating. The public is taking to the air in droves.

The air transport industry has a brilliant future of public service ahead of it, not only because of the speed advantage—which entices customers away from competing ground transport, and creates other customers who otherwise would not travel at all—but because the United States population is growing now at a rate that would have been unbelievable 15 years ago.

The impressive population growth has been interpreted dramatically by V. D. Reed in Printers Ink magazine, in an article which we commend to the air transport industry:

America's Growing—Is Your Business?

Today that tired and busy stork, if he keeps to schedule, will deliver 10,591 live babies in America. Today that sad and ruthless old man with the scythe will cut down 4,074 of our people. Today 85 people will emigrate from our country and 720 will migrate into it. Our net increase in population today will be 7,062. This month it will be well over 200,000.

In fact, during the month of July (1952) it increased by 254,000. That is equivalent to adding a Miami or a Providence in a month.

Census Bureau projections of our population published in August 1950 estimated our 1960 population at 169 million. That estimate has already been revised upward to 171 million. We shall have 21½ million more residents and consumers by 1960; that means one and one-half Canadas added to our population in 10 years. Our estimated population by 1975 is 193 million—that means three Canadas more than in 1950.

These figures emphasize the tremendous growth ahead for our still-adolescent economy and raise an important question for market planning: Is your business getting ready to meet the challenge of 21½ million more customers by 1960?

There is no reason why the air transport industry cannot win a higher percentage of those millions of new citizens than any other single medium of transportation.

America's growing—are the airlines planning to make the most of that growth? Or will surprised executives still be saying every summer, "We don't know where all these people are coming from"?

—Robert H. Wood

This valve is a Spendthrift

But it needn't be! Valve clearance trouble, with resulting fuel and power waste, is easily detected by the Sperry Engine Analyzer. By using vibration analysis to check each cylinder under normal operating conditions, valve clearances can be adjusted for smoother engine performance. Result . . . engines develop full power—run cooler—use less fuel—last longer.

• Vibration analysis, exclusive with the Sperry Engine Analyzer, can be employed either in flight or on the ground. When using the Engine Analyzer, valve clearance can be easily checked at each inspection and overhaul—a profitable procedure for airlines and executive aircraft operators.

• In addition to vibration analysis, the Sperry Engine Analyzer also provides detailed ignition analysis. It immediately detects, locates and identifies irregularities in aircraft power plants—either during flight or on the ground. Aside from saving ground maintenance time, the Engine Analyzer enables the flight engineer to maintain proper operating conditions at all times and prevents unnecessary component replacements.

• Our nearest district office will give you complete data upon request.

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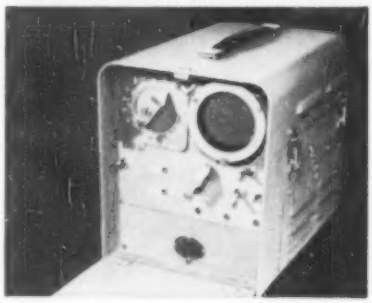

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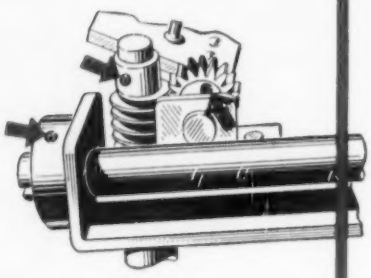

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ROLLPINS saved The Glenn L. Martin Co. $6,300

The Glenn L. Martin Company cut fastening costs on a single missiles contract by $6,300, as compared to dowel pins . . . by $11,700 as compared to taper pins! These installed cost savings, recently announced to Company engineers, were made possible by the use of just 90 Rollpins per unit.

ESNA Rollpin is the slotted tubular steel pin with chamfered ends. It is simply driven into standard holes, compressing as driven. The Rollpin's spring action locks it in place – regardless of impact loading, stress reversals or severe vibration—that's why Martin was able to make these savings on this contract for pilotless bombers.

No precision-drilling, threading or peening . . . no extra operations!

If you use locating dowels, hinge pins, rivets, set screws . . . or straight, knurled, tapered or cotter-type pins—Rollpin can cut your costs, too. Just mail the coupon for design information.

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